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Draft Plan Amendment & Draft Environmental Impact Statement/ Draft Environmental Impact Report for the Alta East Wind Project

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DOI Document Control Number: DES 12-18
Publication Index Number: BLM/CA/ES-2012-007+1793
CACA-0052537

Alta East Wind Project
by Alta Windpower Development, LLC
(PP11212)

Volume 4
Appendices D-15 through D-31

General Plan Amendment 2, Map 168;
General Plan Amendment 3, Map 179;
General Plan Amendment 1, Map 180;
Zone Change Case 10, Map 168;
Zone Change Case 4, Map 168-27;
Conditional Use Permit No. 7, Map 168

Kern County
Planning and Community Development Department
Bakersfield, California

United States Department of the Interior
Bureau of Land Management; California Desert District Office
Moreno Valley, California

June 2012

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June 2012

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Desert Tortoise Survey 2009

Appendix D-15

Desert Tortoise Survey 2009

Presence/Absence Survey for the Desert Tortoise *(Gopherus agassizii)* on the proposed Sun Creek Project, Kern County, California

August 25, 2009

Prepared for

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EXECUTIVE SUMMARY

As recommended in the US Fish and Wildlife Service (USFWS) *Survey Protocol for any Non-Federal Action that may Occur within the Range of the Desert Tortoise* (January 1992), a desert tortoise *(Gopherus agassizii)* presence or absence survey was conducted on the proposed 2,182 acre Sun Creek Project site located approximately 2.5 miles northwest of the town of Mojave in Kern County, California. All 2,182 acres within the project area were delineated as potential desert tortoise habitat. The delineated area was surveyed for desert tortoises and tortoise sign from 20 - 27 May 2009. Access to adjacent lands was not obtained. As such, no zone-of-influence transects were conducted. The survey area ranges in elevation from 3,141 to 4,053 ft and is characterized by multiple vegetation communities including Mojave creosotebush desert scrub, Joshua tree woodland, juniper woodland, mixed upland desert scrub, and desert riparian along Cache Creek. Four adult tortoises and one juvenile were found on the site, as well as 28 burrows, 1 shell-skeletal remains, and 40 scat events.

Most common human impacts within the survey area were paved highways, railroad tracks, dirt roads, Off Highway Vehicle (OHV) trails and campsites, and degradation due to sheep grazing. The overall habitat condition is good, although many areas are severely degraded, mainly due to heavy OHV use of the area.

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INTRODUCTION

This report addresses the results of a presence/absence survey for the state and federal threatened desert tortoise on the proposed Sun Creek Wind Farm Project in Kern County, California. Potential desert tortoise habitat was delineated based on vegetation, elevation, and topography.

The proposed project is located approximately 2.5 miles northwest of the City of Mojave, California and comprises approximately 3.5 square miles. The site is located along the Highway 58 corridor in the foothills of the Tehachapi Mountains and in the adjacent Mojave Desert (Figure 1). The site includes Sections 28 and 34, and portions of Sections 26, 27, 33, and 35 in Township 32S, Range 35E, and part of Section 31 in Township 12N, Range 12W (U.S. Geological Survey (USGS) Mojave 7.5-minute series topographic quadrangle). The elevation of the proposed project site ranges from 3,141 to 4,053 feet above mean sea level (Figure 2).

A total of 2,182 acres were surveyed for desert tortoises and tortoise sign between 20 May 2009 and 27 May 2009.

METHODOLOGY

HABITAT DELINEATION

Delineation of the potential desert tortoise habitat was done prior to commencing the survey. Vegetation, elevation, and topography were considered for the delineation. All typical vegetation communities used by desert tortoises throughout their geographic range were included in the survey area (Figure 2). Additionally, the ecotone communities between suitable habitat and unsuitable habitat were included (i.e. juniper tree – Joshua tree woodland ecotone).

SURVEY METHODOLOGY

The following methodology was used to increase efficiency in determining presence or absence of desert tortoises through systematic search and location of tortoises, their burrows and other sign. This methodology has proven accurate on other large-scale presence/absence surveys for desert tortoise.

A team consisting of twenty experienced desert tortoise biologists conducted the survey by walking a set of transects that covered the 2,182 acre survey area. Transect spacing was at 30 feet between transect centerlines, the standard specified width for desert tortoise presence/absence surveys (USFWS 1992). No more than five biologists surveyed together in a team, as larger team sizes decrease efficiency and accuracy.

A set of UTM coordinates for transect endpoints for virtual north-south and virtual east-west transects were calculated. This resulted in over 600 miles of transects varying in length from 50 feet to 1 mile. For navigation of transects Lowrance iFinder handheld global positioning system (GPS) units were used.

Each team was equipped with an iFinder GPS. One member of each team was responsible to navigate the selected transect. When the end of a transect was reached, the team shifted five transects (for a five person team) and the navigator programmed the beginning and ending point of the team center transect for the next sweep.

Team members focused on a search area that extended 15 feet on either side of them. The members of each team remained close to one another without leading or lagging in order to increase the precision of searching. When one member of the team stopped to investigate an observation, all members of the team stopped. Team members were instructed to search beneath every shrub.

In very steep areas of Sections 28 virtual east-west or virtual north-south transects were not used. Due to the rugged terrain, this approach would not be efficient. Instead transects were designed to follow the terrain paralleling the canyons and ridgelines, and very steep sections were eliminated due to worker safety and unsuitable tortoise habitat.

Data Recorded

Any tortoise or large mammal burrows encountered that could potentially be used by tortoises were visually checked and probed when the end was not visible. Very small burrows that could be potentially utilized by juvenile tortoises but are much more often rodent burrows were also visually checked when encountered. Only definitive tortoise sign was recorded. The locations of all desert tortoise finds are depicted in Figure 3.

Biological Field Team

The field survey was managed by Mercy Vaughn. The biological team for the survey was as follows:

James Borgmeyer	Bruce Weise	Brooks Hart
Dave Prival	Ashley Spenceley	Martin Figueroa
Lori Rose	Debbie Vaughn	T.G. Jackson
Myles Traphagen	Phil Rosen	Colin Spake
Betsy Wirt	Kiea Wright	Josh Holloway
Brendon Nosratbakhsh	Susan Moore	Mercy Vaughn
Erin Zylstra	Wayne Ball	

RESULTS

Survey Area

The survey area ranges in elevation from 3,141 to 4,053 ft and is characterized by multiple vegetation communities including Mojave creosotebush desert scrub, Joshua tree woodland, juniper woodland, mixed upland desert scrub, and desert riparian along Cache Creek. Habitats are described per USGS quadrangle map section below. The geomorphology of the survey area includes upper bajada to steep foothills with predominantly silty sand soils; areas of gravel and cobble; and deeply incised washes (see Photos, Figure 4). The most common human impacts observed within the survey area were paved highways, railroad tracks, dirt roads, Off Highway Vehicle (OHV) trails and campsites, and degradation due to sheep grazing. The overall habitat condition is good, although many areas are severely degraded, mainly due to heavy OHV use of the area.

SECTION 34

Section 34 lies in the Horned Toad Hills 0.5 mile south of Highway 58, and 0.5 mile west of the Los Angeles Aqueduct road. Relatively flat, undulating bajada in the east, gradually climbs west into the Tehachapi foothills where it becomes very steep, with sharply undulating terrain, especially in the northwest corner. There are a number of small to medium sized washes draining the site to the east-southeast on the north and south sides of Section 34. The soil ranges from fine sand to sandy loam, with areas of large pebbles and cobbles in washes at higher elevations. This section contains a high plant diversity, including *Larrea tridentata* (creosotebush), *Yucca brevifolia* (Joshua tree), *Krascheninnikovia lanata* (winterfat), *Ambrosia dumosa* (burrobush), *Hymenoclea salsola* (cheesebush), *Acamptopappus sphaerocephalus* (goldenhead), E*ricameria cooperi* (Cooper's goldenbush), *Tetradymia stenolepis* (Mojave horsebrush), *Eriogonum fasciculatum* (California buckwheat), *Ephedra nevadensis* (Nevada joint-fir), *Chrysothamnus nauseosus* (rubber rabbitbrush) and *Grayia spinosa* (spiny hop-sage). Recreational OHV use has caused significant damage. There are extensive trail and road networks throughout the area with numerous large, completely denuded campsites. This extensive OHV use was observed on surrounding hills and valleys both on and adjacent to the site. Because of regular and repeated use, these areas suffer from soil compaction and considerable erosion, affecting runoff and revegetation potential. Evidence of sheep grazing in this section is minimal. Despite the extensive OHV damage to the area, this section is highly suitable tortoise habitat. The steep hills and deeply incised washes provide some security from OHV activity as well as thermal buffering and potential forage during years of low precipitation.

SECTION 35

Section 35 lies in the Horned Toad Hills 0.5 mile south of Highway 58. The Atchison Topeka and Santa Fe Southern Pacific railroad forms the eastern edge of Section 35 and it is diagonally bisected by the Los Angeles Aqueduct road. The topography is a relatively flat bajada sloping gently to the southeast. The soil ranges from fine sand to sandy loam. The western half of this section contains a high diversity of plants similar to the species identified in Section 34. The shrub diversity in the eastern half diminishes to creosotebush, burrobush, Cooper's goldenbush, and *Eriogonum fasciculatum* (California buckwheat). Recreational ATV's and off-road use have caused significant damage. There are extensive trail and road networks throughout the area with numerous large, completely denuded campsites. This is also the case on portions of hills and surrounding valleys. As in Section 34, these areas suffer from soil compaction and considerable erosion. Evidence of sheep grazing in this section is minimal. Despite the extensive OHV damage to the area, this section is highly suitable tortoise habitat.

SECTION 27

Section 27 lies along the southern edge of Atchison Topeka and Santa Fe Southern Pacific railroad, about 0.5 mile south of Highway 58. Topography ranges from gently undulating bajada in the east end to steep north-facing foothills at the west end. Soils range from sand and gravel to compacted clay. Drainages and washes were typically sandy. Steep slopes often had poor soil development and were covered with coarse granitic gravel and outcroppings of solid granite. Plateau areas to the east tended to have higher clay content and consisted primarily of sandy loam. The primary habitat type in this area was creosotebush scrub with some areas of Joshua tree dominance. Lower elevation areas were dominated by creosotebush, Cooper's goldenbush and *Bromus tectorum* (cheat grass). Steep north-facing slopes in the western portion of section 27 contained *Juniperus californica* (California juniper) and *Purshia tridentata* var. g*landulosa* (Mojave antelope bush). Rubber rabbitbrush) was present in high concentrations within lower sandy areas and alongside disturbed OHV trails and roads. Off-road travel and OHV use was evident, and the survey area was traversed by single-track trails and well defined dirt roads. Shotgun

shells provided evidence of hunting and target practice targets were strewn about in the east end of the section. Old dump sites were intermittent. Evidence of sheep grazing was minimal. Despite the moderate OHV damage in the area, this section contains suitable tortoise habitat.

Section 26

Section 26 is bisected by the Business Highway 58 turn off; the Los Angeles Aqueduct road bisects the eastern side of the section. The topography is characterized by a relatively flat bajada sloping gently to the southeast. The soil ranges from fine sand to sandy loam. Dominant plants include creosotebush,, Joshua tree, winterfat, burrobush, cheesebush, goldenhead, *Encelia actonii* (Acton's encelia), Cooper's goldenbush, Mojave horsebrush, California buckwheat, Nevada joint-fir, rubber rabbitbrush, and spiny hop-sage). Near Highway 58 (within about 200 meters), the area is dominated by *Baccharis* sp., and *Ericameria linearifolia* (interior goldenbush). Cooper's goldenbush, Acton's encelia, cheesebush, and *Yucca whipplei* (our lord's candle) are also present. Evidence of sheep grazing is minimal. Despite the moderate OHV damage in the area, this section contains suitable tortoise habitat.

Section 28/Portion of Section 33

These sections are located 1.5 miles west of the Los Angeles Aqueduct road. Highway 58 bisects Section 28 running northeast to southwest. The topography of the area is highly variable, with steep foothills in the north turning into upper bajada before being bisected by Highway 58, the railroad, and its associated maintenance road. South of the railroad access road lies the large incised wash of Cache Creek, which drains to the east, following the base of a very steep, long grade. This area of the Tehachapi foothills climbs sharply to the south, and ends at a rolling plateau that drops away to the south-southeast. Most of this steep area was not searched due to the extreme gradient, the safety risks associated with it, and the lack of suitable habitat for tortoises. The shrub density quickly diminished, and it became so steep that rock slides were evident. There was no suitable location or substrate for burrow construction in this terrain. Soils ranged from a sandy loam to coarse gravel to cobbles and boulders in Cache Creek and in the northern section. The vegetation community in the northern half of the section included *Salazaria mexicana* (paper-bag bush), California juniper, Joshua tree, burrobush, Nevada joint-fir, California buckwheat, *Atriplex polycarpa* (Allscale), *Amsinckia* spp. (fiddleneck), and spiny hop-sage. The flats below the steep slope in Section 28, south of Highway 58, which included the area between the slope and the highway right-of-way fence were surveyed. In the flats, rubber rabbitbrush was dominant along the railroad tracks. *Baccharis* sp. was dominant in and along the wash. There was also some *Tamarix ramosissima* (Tamarisk) in the wash. Allscale was dominant along the road parallel to the railroad tracks. The vegetation community on the steep slope and the ridge in the southern half of section 28 is characteristic of a mixed upland desert scrub dominated by Joshua tree, California buckwheat, interior goldenbush, *Xylorhiza tortifolia* var. *tortifolia* (Mojave aster), our lord's candle, Acton's encelia, *Achnatherum speciosum* (desert needle grass), Cooper's goldenbush, *Lycium andersonii* (Anderson thornbush), *Lepidium fremontii* (desert alyssum), goldenhead and *Penstemon incertus* (Western desert penstemon). There are moderate dirt road and OHV trail networks throughout the southern area, railroad tracks, dirt roads, and Highway 58 near the center of the section. Evidence of sheep grazing is minimal. Despite the moderate OHV damage in the area, this section contains suitable tortoise habitat.

Survey Results

Desert tortoise is listed as a threatened species by both state and federal governments (California Department of Fish and Game, 2006b). High density annual vegetation cover made finding scat, carcass

parts or other tortoise sign more difficult than in drier years and necessitated careful searching. Four adult tortoises and one juvenile were found on the site, as well as 28 burrows, one shell-skeletal remains, and 40 scats.

DISCUSSION

The survey area as delineated in Figure 2 lies at the far western edge of the geographic range for the desert tortoise. Four adult tortoises and one juvenile tortoise were found along with a moderate amount of other tortoise sign. The presence of a juvenile tortoise indicates reproduction is occurring, however, it is unknown if recruitment is occurring, as no immature tortoises were observed during the survey. It is probable that the proposed project site is supporting a low to moderate density population, which may or may not be viable. A major factor affecting the potential viability of the tortoise population on site is the high OHV activity impacting this area. Soil compaction, loss of shrub cover and forage areas appear to have all resulted from intensive OHV use. In addition, Highway 58 and Highway 14 are not fenced with tortoise proof fencing where they traverse or approach the site. Road mortality on these highways may also be affecting the status of this population. If the widespread, severe human impacts on the site continue, it is probable that desert tortoises in this region will be extirpated. Exclusion of OHV activity would eliminate what appears to be the dominant land use impacting the tortoise on the Sun Creek site.

MITIGATION RECOMMENDATIONS

While it is typical to seek off-site mitigation lands for projects impacting desert tortoise habitat, it is recommended that the Agencies strongly consider on-site mitigation for the Sun Creek Project. Desert tortoises remaining west of SR 14 and south of SR 58 are essentially isolated by both highways as well as railroad tracks, but contiguous suitable habitat occurs to the south to Rosamond Boulevard, which is a sizeable area. The quality of the habitat on site south of Highway 58 is severely degraded by heavy OHV activity, but a few tortoises are still managing to survive and reproduce. With this in mind, the site may be an ideal area to consider headstarting with juvenile tortoises in an attempt to recover these extreme western populations. The area of the project north of Highway 58 and west of Highway 14 was moderately impacted, and the density of desert tortoise sign noted was considerably lower than that documented south of Highway 58.

The limited surface impacts of constructing wind generation facilities may allow for the coexistence of desert tortoises and wind turbines. However these impacts combined with the current land uses (heavy OHV use and moderate sheep grazing) will most certainly and significantly reduce any chance for these very low-density populations to recover, unless a properly developed mitigation plan is executed.

The concept of mitigation lands being purchased off site and conserved in perpetuity is appropriate when dealing with significant reduction in high quality habitat inhabited by stable populations. It is important to note than the ownership of mitigation lands does not guarantee that conservation efforts are being undertaken nor that recovery of the species is occurring. The Sun Creek site and other similar sites are unique in their needs for conservation. Within the far western edge of the species' geographic range, isolated by anthropogenic features, and with very low population densities, the greatest opportunity for recovery these tortoise populations may have is to minimize the threats they currently face while still allowing the proposed project to move forward.

Though desert tortoise densities are low the proposed project may result in both direct and indirect impact to the desert tortoises in the area. In order to minimize indirect impacts through loss of habitat the following measures are recommended.

Mitigation Recommendations for Habitat Enhancement:

a. Terminate existing grazing leases.

b. Fence an agreed upon acreage of suitable desert tortoise habitat to keep out OHV and sheep activity for the life of the project that will allow tortoises to move freely and maintain genetic exchange. With such a measure the wind farm may, in fact, be beneficial for the conservation of the tortoise as well as other desert wildlife species.

c. Revegetate denuded areas and areas temporarily used during construction to improve habitat for desert tortoises.

d. Use existing roads whenever practicable in order to minimize new surface disturbance.

In order to mitigate potential direct impacts, the following measures will help minimize the potential for "take" of tortoises during and after construction.

Develop a biological monitoring plan in consultation with the USFWS and the CDFG. This plan would describe all measures to be implemented prior to, during and post-construction, which would include, but not be limited to, the following measures:

a. All land survey crews on site prior to construction will be escorted by a qualified desert tortoise biologist (approved by USFWS and CDFG). Land survey crews frequently travel cross-country in vehicles prior to construction and a qualified tortoise monitor will clear the path immediately in front of the survey crew.

b. All vehicular traffic with limited visibility related to the project during construction, be it on existing roads or cross country will be escorted by a qualified biologist unless temporary tortoise proof fencing is erected in these areas.

c. Site access will be limited to designated access roads so as to avoid "take" on unmonitored roads.

d. Project speed limit will not exceed 15 MPH during construction and operations.

e. Temporary tortoise-proof fencing (1"x 2" mesh hardware cloth) may need to be erected and maintained between the interface of the project construction areas and any remaining desert tortoise habitat prior to initiating construction and clearance surveys for desert tortoises on site. The fence will prevent tortoises from wandering onto the wind turbine sites. Fencing would be maintained with oversight by an authorized biologist. Fence installation would be monitored by a qualified tortoise biologist.

f. Tortoise clearance surveys will be conducted at 15-foot intervals. It is recommended that two desert tortoise clearance surveys without finding any tortoises or new tortoise sign be conducted

prior to declaring the fenced construction sites free of tortoises. All burrows that could provide shelter for a desert tortoise will be excavated during the first clearance survey. If a tortoise is encountered while conducting a clearance survey or during burrow excavation the tortoise will not be handled but will be monitored from a distance to ensure its safety. The temporary tortoise-proof fencing will be removed, and no further construction will occur in the area until the tortoise has moved on its own out of the area.

g. All construction personnel will undergo desert tortoise awareness training.

h. After the tortoise proof-fence is erected a qualified biologist(s) will remain onsite until all vegetation is cleared and, at a minimum, conduct site and fence inspections on a bi-weekly basis throughout construction in order to maintain compliance with mitigation measures.

i. A qualified biologist(s) will be onsite to survey for tortoises immediately in front of vegetation clearance activities in the event a tortoise was inadvertently missed during clearance surveys.

j. A biologist will remain on-call throughout construction in the event a tortoise wanders onto a construction site.

k. A raven management plan will be developed for the project site.

l. The project proponent will maintain an environmental awareness training program for all maintenance employees.

m. The project proponent will provide post-construction reports to USFWS and CDFG within 90 days of completion of construction documenting any tortoise or tortoise sign encounters as well as measures taken.

LITERATURE CITED

California Department of Fish and Game. 2006a. California's plants and animals: Animal Species of Special Concern. Species lists published and updated by California Department of Fish and Game, Habitat Conservation Planning Branch. Dated 1 February 2006. Sacramento, CA.

California Department of Fish and Game. 2006b. State and federally listed endangered and threatened animals of California. Species lists published and updated by The Resources Agency, Department of Fish and Game, Habitat Conservation Division, Wildlife and Habitat Data Analysis Branch, California Natural Diversity Data Base. Dated January 2006. Sacramento, CA.

California Natural Diversity Database, Biogeographic Data Branch, Department of Fish and Game, September 01, 2007

Hickman, J. Editor. 1993. *The Jepson Manual: Higher Plants of California.* University of California Press. Berkeley, CA.

Holland, R. 1986. Preliminary descriptions of the terrestrial natural communities of California. California Department of Fish and Game. Sacramento, CA.

Ingles, L. 1965. *Mammals of the Pacific States: California, Oregon, Washington.* Stanford University Press. Stanford, CA.

Jaeger, E. 1969. *Desert Wild Flowers.* Stanford University Press. Stanford, CA.

Munz, P. 1974. *A Flora of Southern California.* University of California Press. Berkeley, CA.

U.S. Fish and Wildlife Service. 2002. Birds of Conservation Concern. Division of Migratory Bird Management. Arlington, VA.

TABLE 1. DESERT TORTOISE AND SIGN LOCATIONS

Sign	Easting	Northing
Live Adult in burrow	389248	3884491
Live juvenile in burrow	389217	3885818
Live Adult in burrow	389353	3885684
Live Adult under California juniper	389458	3884858
Live Adult in Burrow	389638	3885797
Tortoise tracks	389322	3885496
Tortoise tracks	389390	3885660
Tortoise tracks	389520	3885572
Tortoise tracks	389531	3885808
Tortoise tracks	389555	3884616
Tortoise tracks	389603	3885792
Burrow	389110	3885712
Burrow	389248	3884491
Burrow	389261	3885643
Burrow	389251	3885668
Burrow	389217	3885818
Burrow	389196	3885647
Burrow	389328	3885460
Burrow	389431	3885435
Burrow with scat	389434	3885467
Burrow	389467	3885801
Burrow	389549	3885698
Burrow	389787	3884312
Burrow	389812	3884416
Burrow	390240	3886225
Burrow	387808	3885982
Burrow	389054	3885324
Burrow	389055	3885656
Burrow and scat	387539	3887036

TABLE 1. DESERT TORTOISE AND SIGN LOCATIONS

Sign	Easting	Northing
Burrow and scat	388152	3887500
Burrow	388085	3887413
Burrow	390106	3884340
Burrow	390082	3884294
Burrow	388677	3886110
Burrow	388370	3886036
Shell - skeletal remains	390191	3884435
Scat	389153	3884537
Scat	389158	3885750
Scat	389140	3885771
Scat	389119	3885782
Scat	389100	3885766
Scat	389118	3885729
Scat	389325	3885660
Scat	389337	3885666
Scat	389376	3885473
Scat	389379	3885392
Scat	389445	3884752
Scat	389438	3885350
Scat	389438	3885380
Scat	389428	3885613
Scat	389438	3885626
Scat	389402	3885748
Scat	389392	3885705
Scat	389470	3885572
Scat	389575	3885685
Scat	389555	3885691
Scat	389748	3885441
Scat	389037	3885696

TABLE 1. DESERT TORTOISE AND SIGN LOCATIONS

Sign	Easting	Northing
Scat	389094	3885727
Scat	389095	3885756
Scat	387539	3887036
Scat	388152	3887500
Scat	390082	3884294
Scat	388459	3886062

UTM coordinates in CONUS NAD 83 Zone 11S

TABLE 2. OTHER SENSITIVE SPECIES AND SIGN LOCATIONS

Date	Observation	Easting	Northing NAD 83, ZONE 11	Comments
LOGGERHEAD SHRIKE				
May 21	adult perched	390475	3885505	Calling in creosote
May 22	adult perched	390227	3884120	In Joshua tree
May 22	adult	389119	3885819	
May 22	adult	387549	3886709	Calling
May 23	adult perched	390976	3884924	In Joshua tree
May 23	adult	389673	3885651	
May 23	adult	389604	3885474	
May 24	adult flying	391600	3885020	
May 24	nest	388007	3886795	3 nestlings
May 24	adult	388378	3886911	Calling
May 24	adult	388521	3887500	
May 26	adult	387521	3886056	
May 26	pair perched	388707	3886639	Pair on fence

UTM coordinates in CONUS NAD 83 Zone 11S

TABLE 3. PLANT SPECIES

Scientific Name	Common Name	Notes
APIACEAE	*Carrot Family*	
Lomatium mohavense	Mojave desert parsley	Annual
ASTERACEAE	*Composite Family*	
Acamptopappus sphaerocephalus	Goldenhead	Shrub; common in Creosote Bush Scrub,(CBS)Sect. 34
Ambrosia acanthicarpa	Annual bur-sage	Annual; disturbed roadside areas
Ambrosia dumosa	Burrobush	Shrub; common in lower elevations, (CBS) Sect. 34
Anisocoma acaulis	Scale-bud	Annual
Artemesia dracunculus	Tarragon	Perennial; occas. in washes, drainage areas, Sect. 31
Baccharis sp.	Baccharis	Perennial shrub; occurs in washes, drainage areas
Calycoseris parryi	Yellow Tack-Stem	Annual
Chaenactis fremontii	Desert pincushion	Annual
Chaenactis sp.	Desert pincushion	Annual
Chrysothamnus nauseosus	Rubber Rabbitbrush	Shrub; abundant on roadsides/old highway 58/aqueduct/washes/disturbed habitat in all sections; highly variable
Chrysothamnus teretifolius	Roundleaf Rubberbrush	Shrub; common in Juniper Woodland (JW) , Sect. 34, 28, 31; occasional in Sect. 26
Circium sp.	Thistle	Perennial; occasional in Sect. 31
Coreopsis bigelovii	Bigelow's coreopsis	Annual
Encelia actonii	Acton Encelia	Shrub; occasional to common in all sections
Ericameria cooperi	Cooper's goldenbush	Shrub; common in CBS, Sect. 34, 26, east 28
Ericameria linearifolia	Interior goldenbush	Shrub; common in Joshua tree Woodland (JTW) and JW , all sections
Eriophyllum pringlei	Wooly sunflower	Annual
Gutierrezia microcephala	Snakeweed	Shrub; common on roadsides or wash edges in Sect. 34, 26, 28, 31
Hymenoclea salsola	Cheesebush	Shrub; common on dry flats and slopes, abundant in washes, Sect. 34, 26
Lasthenia californica	Goldfield	Annual
Lepidospartum squamatum	Scale-broom	Shrub; abundant in sandy or gravelly washes, Sect. 26, 28, 31
Malacothrix glabrata	Desert dandelion	Annual
Malacothrix coulteri	Snake's-head	Annual
Rafinesquia neomexicana	Desert chicory	Annual
Stephanomeria exigua	Annual mitra	Annual
Stephanomeria parryi	Parry rock pink	Herbaceous perennial; occasional on roadsides and dry, open areas
Stephanomeria pauciflora	Chuckwalla's delight	Herbaceous perennial; occasional on

TABLE 3. PLANT SPECIES

Scientific Name	Common Name	Notes
		roadsides and dry slopes/flats, all sections
Stylocline psilocarphoides	Peck nest straw	Annual
Syntrichopappus fremontii	False wooly daisy	Annual
Tetradymia stenolepis	Mojave horsebrush	Shrub; occasional in JTW, Sect. 26
Uropappus lindleyi	Silver puffs	Annual
Xylorhiza tortifolia	Mojave aster	Shrub; occasional to common in JTW, Sect. 34, 26, also on gray substrate in Sect. 34
BORAGINACEAE	Borage Family	
Amsinckia tessellata	Checker fiddleneck	Annual
Cryptantha circumscissa	Western forget-me-not	Annual
Cryptantha decipiens	Gravel forget-me-not	Annual
Cryptantha micrantha	Purple-rooted forget-me-not	Annual
Cryptantha nevadensis	Nevada forget-me-not	Annual
Cryptantha pterocarya	Wing-nut forget-me-not	Annual
Pectocarya heterocarpa	Chuckwalla comb-bur	Annual
Pectocarya recurvata	Arched-nutted comb-bur	Annual
Pectocarya sp.	Comb-bur	Annual
Plagiobothrys arizonicus	Arizona popcorn-flower	Annual
BRASSICACEAE	Mustard Family	
Brassica nigra	Black mustard	Annual
Caulanthus cooperi	Cooper caulanthus	Annual
Descurainia pinnata	Tansy mustard	Annual
Descurainia sophia	Herb sophia	Annual
Guillenia lasiophylla	California mustard	Annual
Hirschfeldia incana	Shortpod mustard	Annual
Lepidium fremontii	Desert alyssum	Shrub; occasional in JTW, Sect. 34, 26, 28
Lepidium lasiocarpum var. lasiocarpum	Peppergrass	Annual
Sisymbrium altissimum	Tumble mustard	Annual
Sisymbrium orientale	Indian hedge mustard	Annual
Stanleya pinnata var. pinnata	Prince's plume	Perennial; occasional on gray substrate in Sect. 34, also Sect. 31
Tropidocarpum gracile	Slender keel fruit	Annual
CACTACEAE	Cactus Family	
Cylindropuntia echinocarpa	Silver cholla	Occasional in CBS and JTW, Sect. 34, 26
Opuntia basilaris	Beavertail cactus	Occasional in all habitats and sections
CAPPARACEAE	Caper Family	
Isomeris arborea	Bladderpod	Shrub; common in CBS, JTW, JW, Sect. 26, 28

TABLE 3. PLANT SPECIES

Scientific Name	Common Name	Notes
CHENOPODIACEAE	Goosefoot Family	
Atriplex canescens	Fourwing Saltbush	Shrub; occasional to common along aqueduct, railroad and roadsides, Sect. 26, 31
Chenopodium album	Lamb's quarters	Annual
Grayia spinosa	Hop-sage	Shrub; occasional to common in CBS, Sect. 34, 26, 28
Krascheninnikovia lanata	Winterfat	Shrub; common on sandy/gravelly slopes in CBS, JTW in Sect. 34, 26, 28
Salsola tragus	Tumbleweed	Annual
CUPRESSACEAE	Cypress Family	
Juniperus californicus	California juniper	Shrub/tree; common to abundant, north Sect 34, Sect. 28 (more abundant in west Sect. 28) and 31
EPHEDRACEAE	Ephedra Family	
Ephedra nevadensis	Nevada joint-fir	Shrub; common-abundant in CBS, JTW, Sect. 34, 26
Ephedra viridis	Green ephedra	Shrub; common-abundant in JTW, JW, Sect.28, 31
EUPHORBIACEAE	Spurge Family	
Chamaecyse albomarginata	White-margin sandmat	Annual
FABACEAE	Legume Family	
Astragalus sp.	Milkvetch	Perennial
Lotus humistratus	Short-podded lotus	Annual
Lotus strigosus	Stiff-haired lotus	Annual
Lupinus microcarpus var. horizontalis	Chick lupine	Annual
Lupinus odoratus	Mojave lupine	Annual
Lupinus sp. 3	Lupine	Annual
Lupinus sp. 4	Bush Lupine	Perennial
GERANIACEAE	Geranium Family	
Erodium cicutarium	Storksbill, Filaree	Annual
HYDROPHYLLACEAE	Waterleaf Family	
Phacelia fremontii	Fremont's phacelia	Annual
Phacelia tanacetifolia	Tansy-leafed phacelia	Annual
Phacelia distans	Lace-leaf phacelia	Annual
LAMIACEAE	Mint Family	
Marrubium vulgare	Horehound	Shrub; occas. to common along aqueduct, Sect. 26
Salvia carduacea	Thistle sage	Annual
Salvia columbariae	Chia	Annual
Salvia dorii	Blue or purple sage	Shrub; occasional in JTW, JW, Sect. 34, 28

TABLE 3. PLANT SPECIES

Scientific Name	Common Name	Notes
LILIACEAE	Lily Family	
Calochortus kennedyi var. kennedyi	Desert mariposa lily	Perennial from bulb; common
Yucca brevifolia	Joshua tree	Tree; occasional to abundant in JTW, often with CBS or JW, Sect. 34, 26, 28, 31
Yucca whipplei	Our lord's candle	Sub-shrub/tree-like; occasional to common in JTW, JW, Sect. 34, 28, 31
LOASACEAE	Loasa Family	
Mentzelia albicaulis	Blazing star	Annual
Petalonyx thurberi ssp. thurberi	Sandpaper plant	Herbaceous perennial; uncommon JW, Sect. 28
LAMIACEAE	Mint Family	
Salazaria mexicana	Bladder sage	Shrub; common in CBS, JTW in Sect. 28
MALVACEAE	Mallow Family	
Eremalche exilis	Small-flowered eremalche	Annual
Sphaeralcea ambigua	Desert mallow	Herbaceous perennial; occasional
NYCTAGINACEAE	Four O'Clock Family	
Mirabilis bigelovii	Wishbone bush	Herbaceous perennial; common in CBS, Sect. 34
ONAGRACEAE	Primrose Family	
Camissonia boothii ssp. desertorum	Booth's desert primrose	Annual
Camissonia campestris	Mojave sun cup	Annual
Camissonia claviformis	Brown-eyed primrose	Annual
Camissonia kernensis ssp. kernensis	Kern County evening primrose	Annual
PAPAVERACEAE	Poppy Family	
Eschscholzia californica	California poppy	Annual
Eschscholzia minutiflora	Little gold poppy	Annual
POACEAE	Grass Family	
Achnatherum hymenoides	Indian rice grass	Perennial bunchgrass; occasional to common in sandy areas, Sect. 34, 26, 28
Achnatherum speciosum	Desert needle grass	Perennial bunchgrass; abundant in CBS, JTW, JW, all sections
Bromus diandrus	Ripgut grass	Annual
Bromus madritensis ssp. rubens	Red brome	Annual
Bromus tectorum	Cheat grass	Annual
Elymus elymoides	Squirreltail	Perennial bunchgrass; all habitats and sections
Hordeum sp.	Wild barley	Annual
Poa secunda	Bluegrass	Perennial bunchgrass; all habitats and sections

TABLE 3. PLANT SPECIES

Scientific Name	Common Name	Notes
Schismus sp.	Split grass	Annual
Vulpia octoflora var. octoflora	Six-weeks fescue	Annual; sandy soils in CBS
POLEMONIACEAE	Phlox Family	
Eriastrum densifolium ssp.mohavense	Woolly star-flower	Herbaceous perennial; occasional
Eriastrum eremicum ssp. eremicum	Eriastrum	Annual
Gilia latiflora ssp. davyi	Broad-flowered gilia	Annual
Gilia sp. 2	Gilia	Annual
Linanthus aureus	Golden gilia	Annual
Linanthus dichotomus	Evening snow	Annual
Linanthus parryi	Parry's linanthus	Annual
Loeseliastrum matthewsii	Desert calico	Annual
Loeseliastrum schottii	Schott's gilia	Annual
POLYGONACEAE	Buckwheat Family	
Centrostegia thurberi	Thurber's spineflower	Annual
Chorizanthe brevicornu var. brevicornu	Spiny-herb	Annual
Chorizanthe watsonii	Watson's spineflower	Annual
Eriogonum angulosum	Angle-stemmed buckwheat	Annual
Eriogonum brachyanthum	Yellow buckwheat	Annual
Eriogonum deflexum var. deflexum	Skeleton weed	Annual
Eriogonum fasciculatum var. polifolium	California buckwheat	Shrub; abundant in CBS, JTW, JW, all sections
Eriogonum gracilimum	Slender-stemed buckwheat	Annual
Eriogonum inflatum	Desert trumpet	Herbaceous perennial, in JW, Section 31
Eriogonum mohavense	Mohave buckwheat	Annual
Eriogonum nudum	Naked buckwheat	Herbaceous perennial, in JW, Sections 31
Eriogonum plumatella	Flattop buckwheat	Shrub; occasional in JTW, Sect. 34, 26
Eriogonum pusillum	Yellow-turbans	Annual
Eriogonum sp.	Buckwheat	Perennial
Eriogonum tricopes	Buckwheat	Annual; common on gray substrate in Sect. 34
Oxytheca perfoliata	Punctured Bract	Annual
PORTULACACEAE	Purslane Family	
Calyptridium monandrum	Sand-cress	Annual
RANUNCULACEAE	Buttercup Family	
Delphinium parishii ssp. parishii	Parish's larkspur	Perennial; occasional in CBS
ROSACEAE	Rose Family	
Amelanchier utahensis	Service-berry	Shrub; occasional in JW, Sect. 31
Purshia tridentata	Antelope bush	Shrub; occasional in JW, Sect. 28, 31

TABLE 3. PLANT SPECIES

Scientific Name	Common Name	Notes
SCROPHULARIACEAE	Figwort Family	
Castilleja exerta	Purple owls clover	Annual
Penstemon incertus	Western desert penstemon	Shrub; occasional in JTW, JW, Sect. 28
SOLANACEAE	Nightshade Family	
Datura wrightii	Jimson weed	Annual to herbaceous perennial
Lycium andersonii	Anderson's thornbush	Shrub; occasional to common in CBS, Sect. 34, 26
Lycium cooperi	Cooper's thornbush	Shrub; common, especially in low drainage areas in all habitats and sections
ZYGOPHYLLACEAE	Caltrop Family	
Larrea tridentata	Creosote	Shrub; abundant in CBS and JTW of Section 34, 26, and northeastern area of 28

TABLE 4. MAMMAL SPECIES

Scientific Name	Common name	Notes
Dipodomys merriami	Merriam's kangaroo rat	
Neotoma lepida	Desert wood rat	
Ammospermophilus leucurus	White-tailed antelope ground squirrel	
Spermophilus beecheyi	California Ground squirrel	
Lepus californicus	Black-tailed jackrabbit	
Felis rufus	Bobcat	sign
Canis latrans	Coyote	pup and adult seen
Vulpes macrotis	Kit fox	sign
Ovis aries	Domestic sheep	sign

TABLE 5. REPTILE SPECIES

Scientific Name	Common name	Notes
Gopherus agassizii	Desert tortoise	USFWS, CDFG threatened
Phrynosoma platyrhinos	Desert horned lizard	
Gambelia wislizenii	Long-nosed leopard lizard	
Dipsosaurus dorsalis	Desert iguana	
Xantusia vigilis	Desert night lizard	
Sceloporus magister	Desert spiny lizard	
Uta stansburiana	Side-blotched lizard	
Callisaurus draconoides	Zebra-tailed lizard	
Aspidoscelis tigris	Western whiptail	
Masticophis flagellum	Coachwhip	
Pituophis melanoleucus	Gopher snake	
Lampropeltis getula	Common kingsnake	

TABLE 6. BIRD SPECIES

Scientific Name	Common name	Notes
Aquila chrysaetos	Golden eagle	seen flying
Callipepla californica	California quail	
Zenaida macroura	Mourning dove	
Bubo virginianus	Great-horned owl	pellets seen
	Unknown hummingbird	
Picoides scalaris	Ladder-backed woodpecker	
Myiarchus cinerascens	Ash-throated flycatcher	
Tyrannus verticalis	Western kingbird	
Lanius ludovicianus	Loggerhead shrike	CDFG-SSC, USFWS-BCC
Corvus corax	Common raven	
Aphelocoma californica	Western scrub jay	
Eremophila alpestris	Horned lark	
Aeronautes saxatalis	White-throated swift	
Campylorhynchus brunneicapillus	Cactus wren	
Salpinctes obsoletus	Rock wren	
Mimus polyglottos	Northern mockingbird	
Toxostoma lecontei	Le Conte's thrasher	CDFG-SSC, USFWS-BCC
Oporornis tolmiei	MacGillivray's warbler	
Spizella passerina	Chipping sparrow	
Spizella breweri	Brewer's sparrow	
Chondestes grammacus	Lark sparrow	
Amphispiza bilineata	Black-throated sparrow	
Amphispiza belli	Sage sparrow	
Sturnella neglecta	Western meadowlark	
Euphagus cyanocephalus	Brewer's blackbird	
Icterus bullockii	Bullock's oriole	
Icterus parisorum	Scott's oriole	
Carpodacus mexicanus	House finch	
Carduelis lawrencei	Lawrence's goldfinch	
Carduelis psaltria	Lesser goldfinch	
Carduelis tristis	American goldfinch	

FIGURES

FIGURE 1. SUN CREEK WIND FARM PROJECT LOCATION, KERN COUNTY, CALIFORNIA

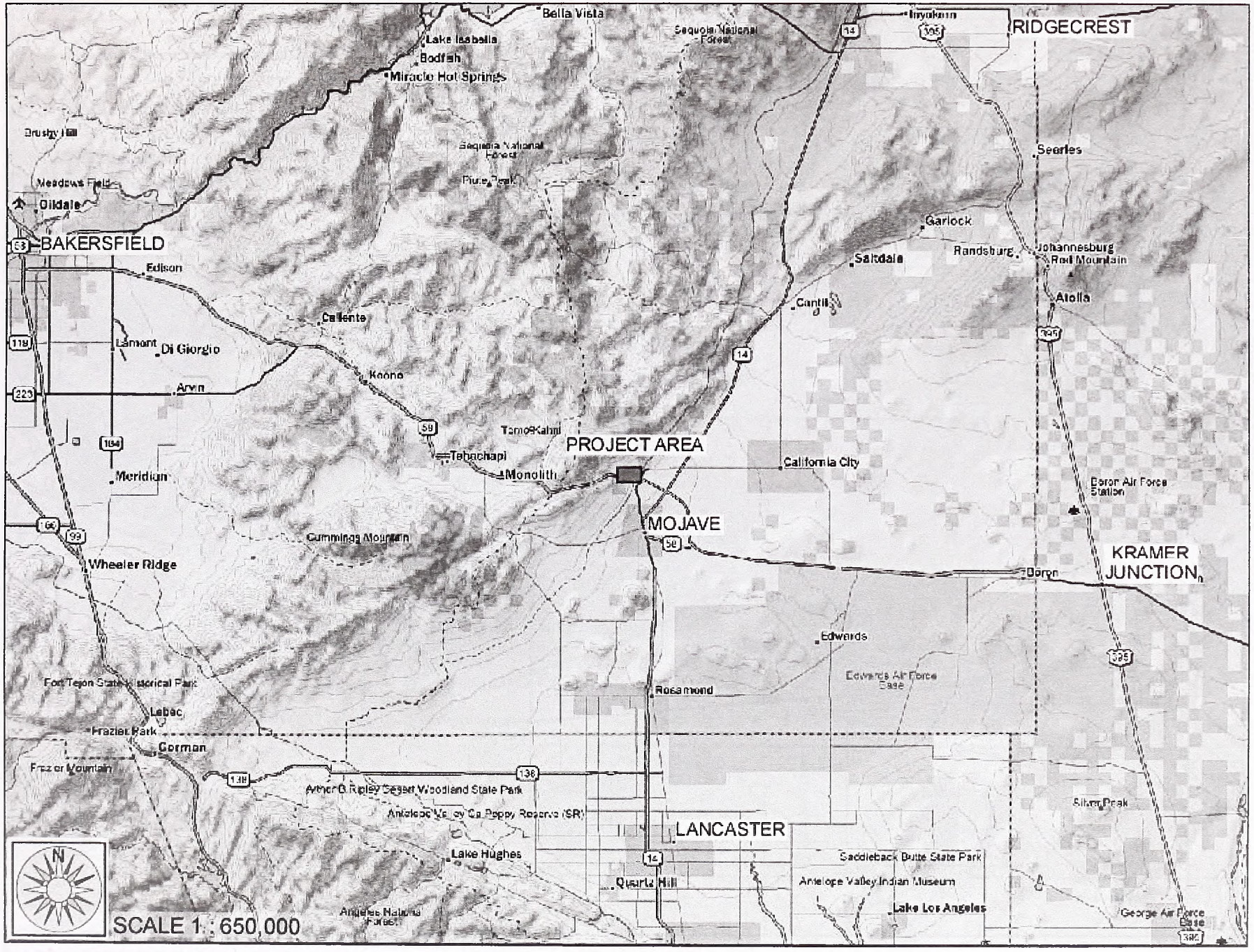


FIGURE 2. DESERT TORTOISE SIGN MAP AND SURVEY AREA ON THE SUN CREEK WIND FARM PROPOSED SITE, KERN COUNTY, CALIFORNIA

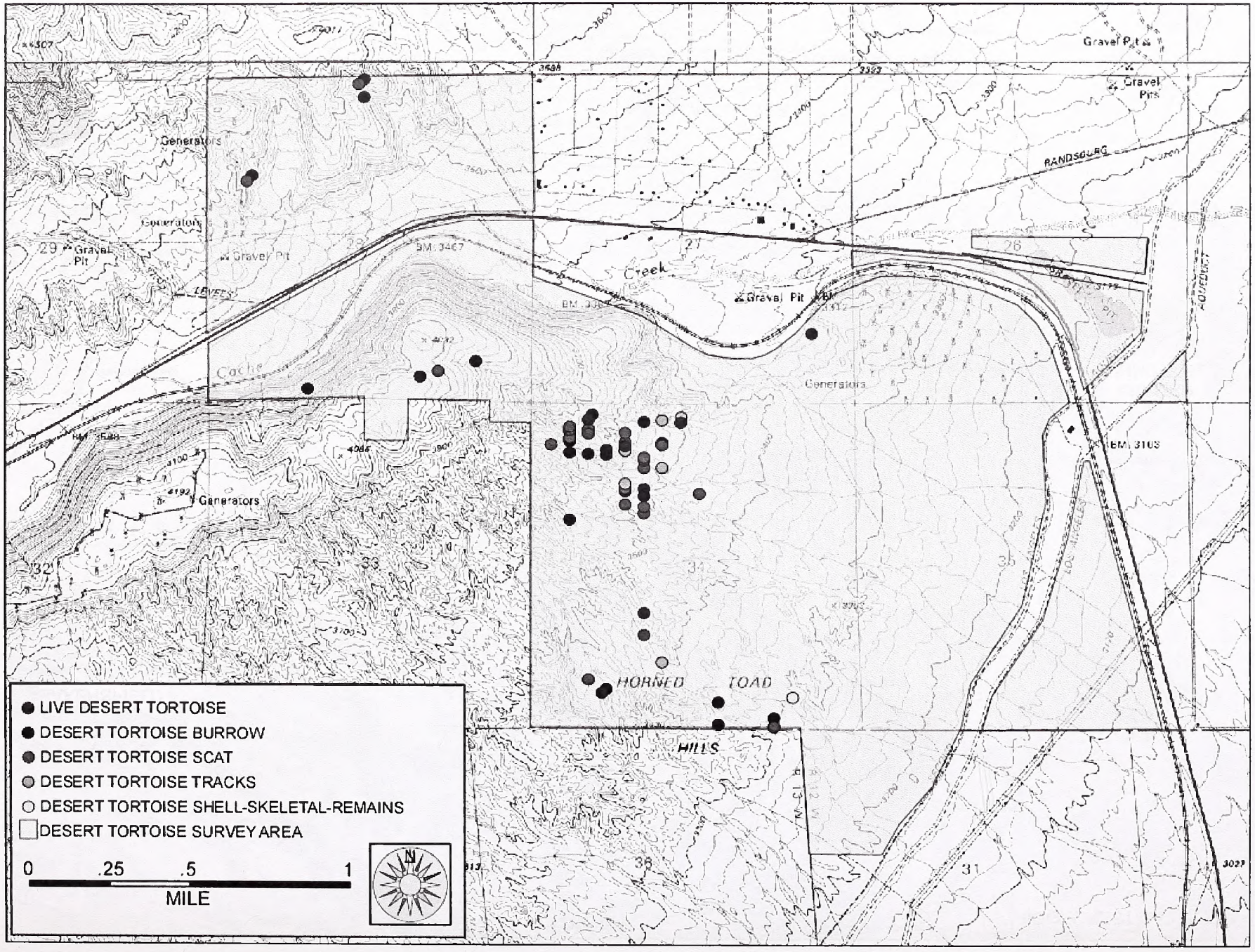


FIGURE 3. SENSITIVE SPECIES OBSERVED ON THE SUN CREEK WIND FARM PROPOSED SITE, KERN COUNTY, CALIFORNIA

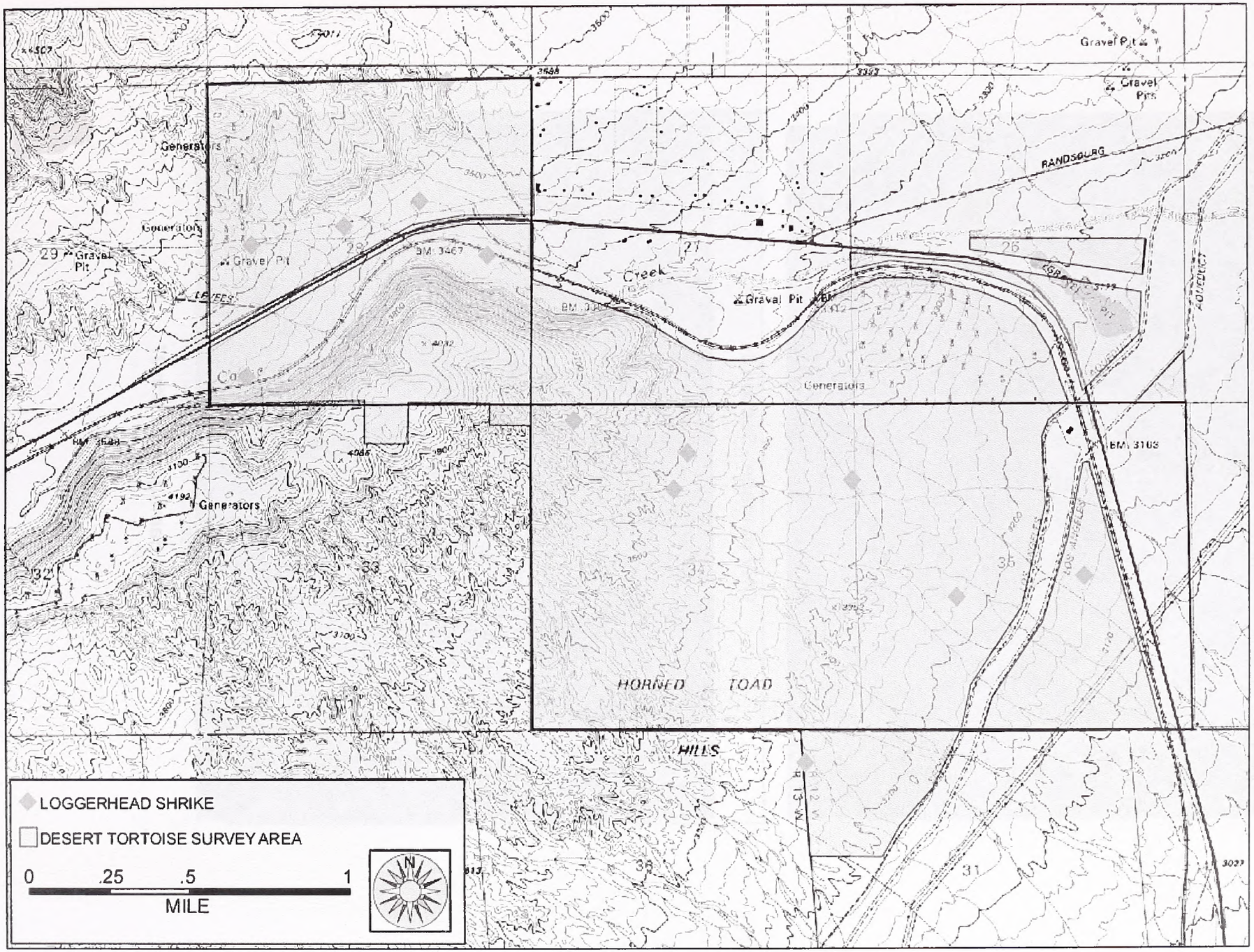


FIGURE 4. HABITAT PHOTOS OF THE SUN CREEK SITE, KERN COUNTY, CALIFORNIA



OHV damage - Section 34



OHV damage – Section 27



OHV damage – Section 34



OHV damage Section 34



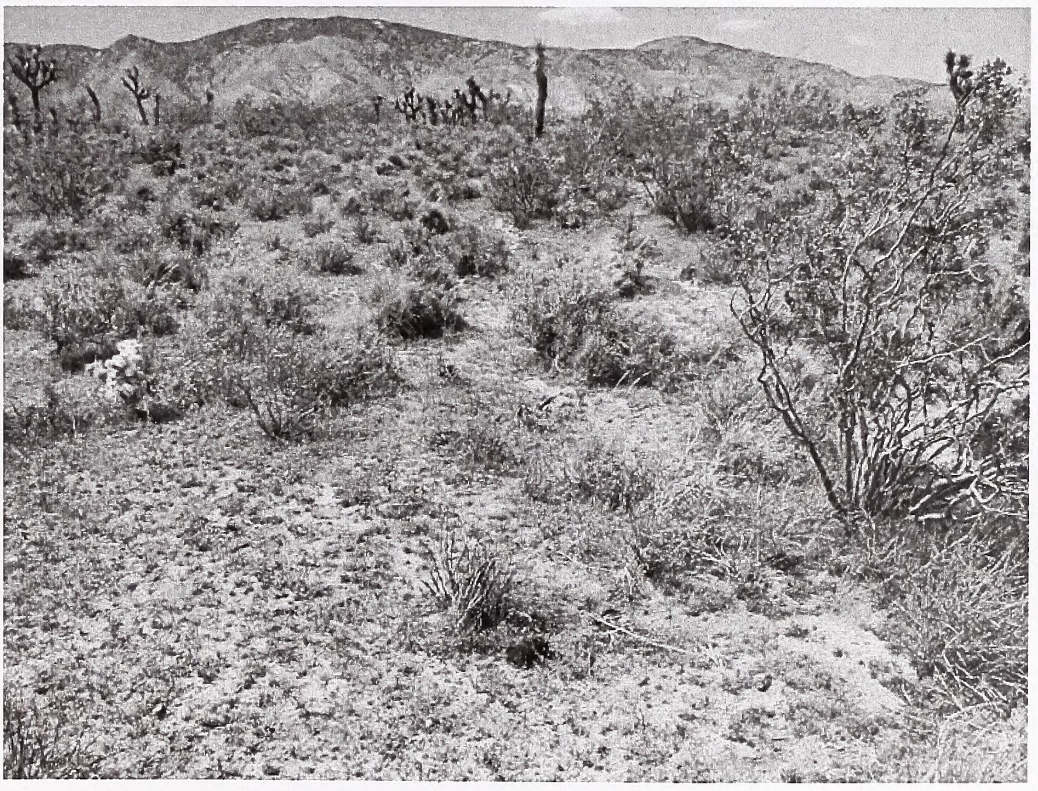
Looking west from Section 27 at Section 28, showing steep slope and Cache Cr.



High elevation low desert scrub showing steep drop to north on Section 28.



Creosotebush scrub - Section 35



Joshua Tree-Creosote bush scrub - Section 34



Juniper-Creosote bush scrub interface – Section 34

FIGURE 5. DESERT TORTOISE SIGN PHOTOS ON THE SUN CREEK SITE, KERN COUNTY, CALIFORNIA



Desert tortoise burrow – Joshua tree-Creosote bush scrub



Tortoise burrow with tracks



Juvenile tortoise burrow



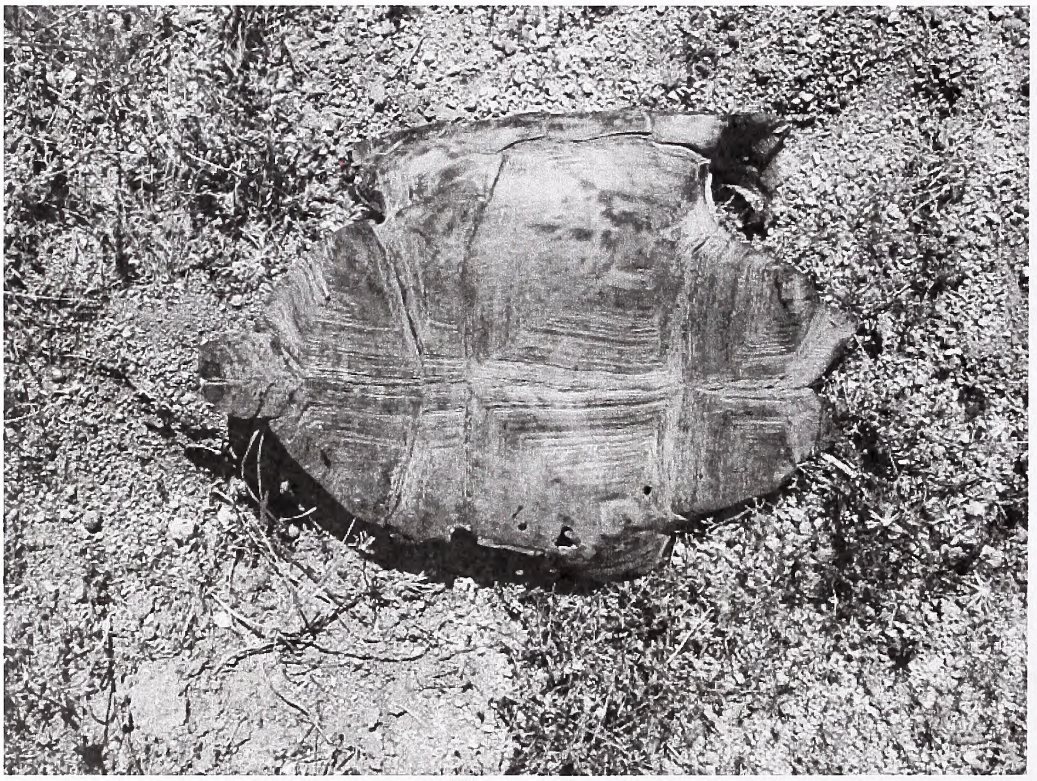
Active tortoise burrow



Tortoise scat



Female tortoise under California juniper



Desert tortoise shell-skeletal remains – female

Appendix D-16

Desert Tortoise – Burrowing Owl Survey 2010

Desert Tortoise (*Gopherus agassizii*) & Burrowing Owl (*Athene cunicularia*) Protocol Presence/Absence Surveys for Sun Creek Wind Resource Area, Kern County, California

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Executive Summary:

At the request of CH2M Hill Inc., Phoenix Ecological Consulting (Phoenix) initiated a protocol desert tortoise (*Goperhus agassizii*) presence/absence survey at a project site known as Sun Creek Wind Resource Area (SCWRA) located northwest of the town of Mojave, CA. Tortoise surveys adhered to the 1992 and 2010 United States Fish and Wildlife Service (USFWS) desert tortoise protocol methodology (USFWS, 1992; USFWS, 2010). Burrowing owl (*Athene cunicularia*) phase II protocol surveys were conducted concurrently. Burrowing owl survey methodology adhered to the California Burrowing Owl Consortium burrowing owl survey guidelines (CBOC, 1993).

The desert tortoise and burrowing owl surveys were conducted during the spring of 2010 from April 24th to May 5th. The survey areas consisted of 1,288 acres within the western portion of the 4,143 acre SCWRA. The survey results for desert tortoise and burrowing owl were negative within the survey areas. Four burrows were detected on site. However, there was no tortoise or owl sign associated with these burrows and the burrows did not appear active.

Introduction and Purpose:

At the request of CH2M Hill Inc., Phoenix Ecological Consulting (Phoenix) initiated a protocol desert tortoise (*Goperhus agassizii*) presence/absence survey at a project site known as Sun Creek Wind Resource Area (SCWRA). Tortoise surveys adhered to the 1992 and 2010 United States Fish and Wildlife Service (USFWS) desert tortoise protocol methodology (USFWS, 1992; USFWS, 2010). Burrowing owl (*Athene cunicularia*) phase II protocol surveys were conducted concurrently. Burrowing owl survey methodology adhered to the California Burrowing Owl Consortium burrowing owl survey guidelines (CBOC, 1993). The project is part of the expanding wind energy complex situated along the foothills of the Tehachapi Mountains. Within the project boundary, the project proponent, Alta Windpower Development, LLC, proposes to install up to 100 3 MW wind turbines. The project site is located in southeastern Kern County, west of the town of Mojave, CA, along the southern edge of highway 58 and west of highway 14 (Figure A). The SCWRA consists of approximately 4,143 acres (the "site") and is located near the western range limits of the desert tortoise with the elevation ranging from 3,600 to 3,900 feet. This report addressed protocol surveys conducted on 1,288 acres within the western portion of the SCWRA (Figure A). Zone-of-Influence (ZOI) surveys and buffer areas were not conducted due to private property restrictions. Habitat within the site and the larger SCWRA consists of Joshua /Juniper tree woodland, Mojave mixed woody scrub and creosote scrub.

Habitat and Land Use:

The SCWRA is situated along a middle-upper bajada with soils ranging from hard-packed granitic alluvium to sandy-loam at lower elevations. The area is referred to as the Horned-Toad Hills on the Mojave 7.5 minute quadrangle topographic map (Figure A). The 1,288 acre survey area is situated in Section 32, 33 and 34, Township 32 South & 12 North & Range 13 West, within the Mojave quadrangle. The entire 4,143 acres include sections 26-28 & 31-35. The drainages that bisect the site tend to flow in a northwest to southeasterly direction. Soils

within existing washes are sandy with low density cobble/pebble matrix. The aspect is southeasterly throughout the site. The topography ranges from steep hills with a 70-100% slope on the northwestern edge, along Highway 58, to 20-40% slopes along the mid bajada, on the southeastern edge. Representative habitat photos of the polygons are depicted in Figures D-F.

The vegetation communities included creosote bush (*Larrea tridentata*)/Bursage (*Ambrosia dumosa*) scrub, Joshua tree woodland (*Yucca brevifolia*), juniper woodland/Mojave-mixed woody scrub and desert riparian wash communities. Dominant perennials include creosote (*Larrea tridentata*), Joshua tree (*Yucca brevifolia*), California juniper (*Juniperus californica*) cheesebush (*Ambrosia salsola*), Cooper's goldfenbush (*Ericameria cooperii*) and California buckwheat (*Eriogonum fasciculatum*). Dominant annuals include Mojave spurge (*Euphorbia incisa*), filaree (*Eriodium cicutarium*), fiddleneck (*Amsinkia tesselata*), *Cryptantha sp.* and *Phacelia distans*. The entire list of vascular plants and vertebrate species, detected during the tortoise surveys, can be found on Table 2 & 3.

The elevation ranges from 3,600 feet, along the southern edge, to 3,900 feet along the northwestern edge. The evidence of human disturbance is noticeable within the project footprint in the form of off-highway vehicle (OHV) trails, occasional trash piles, livestock grazing and utility corridors. There is existing wind turbines located in Section 32, along the ridge of the horned toad hills, adjacent to highway 58.

Desert Tortoise Species Description

The desert tortoise (*Gopherus agassizii*) is a desert dwelling reptile with large elephantine appendages and a dome-shaped shell. Desert tortoise range includes most of the Mojave and Colorado deserts in California. It is inhabits portions of Nevada, Arizona and Mexico. It was listed, by emergency rule, as an endangered species by the USFWS in August 4, 1989 and later downgraded to threatened status on April 2, 1990. It is also listed as threatened species by the California Department of Fish and Game (CDFG). Several human induced factors have led to their demise: urban development in the desert, OHV use, livestock, collecting and

poaching and increased Common Raven (*Corvus corax*) populations which predate on juvenile and immature tortoises. Other factors which have had a negative effect on desert tortoise populations include diseases such as *Mycoplasma agassizii*, herpes virus and shell diseases such as cutaneous dyskeratosis. Although, it is believed these diseases may have been around for several decades, when combined with environmental stress factors such as drought, air pollution and increased predation from ravens and dogs the otherwise and somewhat previous acceptable levels of disease and mortality within the population began to increase rapidly. Large die-offs in the populations were reported in the 1980s and 1990s during study plots conducted by Dr. Kristin Berry and others in the California deserts which has led to further concern for their long-term viability. Natural predators include coyotes, mountain lions and badgers.

Desert tortoise habitat can include desert washes, desert flats, bajadas, alluvial fans, rolling hills, rocky hills and valleys. Vegetation communities that are known to provide suitable habitat include creosote scrub, saltbush scrub, Joshua tree woodlands, Mojave mixed-woody scrub, juniper woodlands and blackbrush scrub within elevations of 300 to 5,000 feet (USFWS, 2010). Preferred tortoise habitat (areas of high density), in the Mojave Desert, typically include areas along mid-upper bajadas with abundant annuals, washes, and friable soils for burrow excavation in the 2,500 to 3,500 elevation zone.

Desert tortoises can be active during any month of the year but usually are dormant through most of the winter months and during hottest periods of the summer. Tortoise activity increases significantly with the onset of spring annual vegetation when temperatures range from the 75-85 °F and during periods of precipitation. Courtship and mating occur during the early spring months and egg-laying can occur during late spring to early summer. Neonates are born in late summer-early fall and usually spend several years occupying rodent burrows and feeding on annuals within close proximity natal burrow. Desert tortoises reach sexual maturity around twelve years of age when they reach a mean carapace length of approximately 160 millimeters. Tortoises live in dirt burrows, caliche caves and rock shelters which can be up to 6-9 meters in length. Their home range may extend to a square mile. Tortoises are thought to live up to 60-80 years in optimum conditions.

Burrowing Owl Species Description

Burrowing owls (*Athene cunicularia*) are a small, long-legged, ground-dwelling owl that occurs from British Columbia, throughout North America and portions of Central and South America. They are typically nocturnal but are also known to be crepuscular (active dawn and dusk). Typical prey items include invertebrates, small mammals, lizards, snakes and small birds. They nest underground in burrows and clutches range between 9-11 eggs. Burrow entrances and nests are adorned with cow chips, feathers, grass, food items and dog feces. They are typically monogamous and tend to exist in colonies. They exhibit high nest fidelity and will return to the same burrow nest site for multiple years.

Burrowing owls occur in a variety habitat types throughout California; such as, annual and perennial grasslands, agriculture fields, deserts and scrublands characterized by low-growing vegetation (CBOC, 1993). Suitable owl habitat may also include areas with trees and shrubs where canopy cover is less than 30% of ground surface. Suitable burrows may include both artificial and natural burrows that provide shelter from the elements as well as protection from predators. Burrowing owls also use burrows for nesting during spring and early summer months. California ground squirrel (CGS; *Spermophilus beecheyi)* is known to provide suitable burrows as well as inactive coyote, kit fox, badger and desert tortoise burrows. Burrowing owls can also create and/or modify existing burrows. Artificial burrows may include culverts, concrete pipes, wood debris piles and openings beneath cement or asphalt.

In desert scrub habitat, they are usually associated with canid (i.e. fox and coyote) and CGS burrows along mounds that provide vistas for viewing prey and predators. They are also found along washes and wash banks where small mammal and invertebrate abundance is higher. Burrowing owls are a BLM sensitive species and a California species of special concern. They are also protected under the Migratory Bird Treaty Act (MBTA) and within sections 3503, 3503.5 and 3800 of the California Department of Fish and Game Code which prohibits the take, possession, or destruction of birds, their nests or eggs (CBOC, 1993).

CNDDB Rarefind Database and Literature Review Results

A thorough literature review was conducted prior to the field work to determine the likelihood of desert tortoise and burrowing owl encounters within the project footprint and to assess the location of the site relative to the range of the desert tortoise. Several sources were used in compiling desert tortoise range maps. These include the West Mojave Plan (WEMO) density layers, the California Natural Diversity Database (CNDDB), biological technical reports, from Phoenix and other consulting firms, within the vicinity, and the 2010 USFWS desert tortoise field season protocol range maps.

Desert Tortoise

The CNDDB Rarefind 3 database includes two records in proximity: Occurrence #36 (approximately 2.4 miles to the northeast on BLM land, one adult in 1994) & Occurrence #32 (approximately 6.7 miles to the northeast on BLM land, two juveniles were sighted in 1995 along Barren ridge at mile post 88 of the LA Aqueduct; CNDDB, 2010). In addition, Sundance Biology, Inc. (Sundance) identified five tortoises (four live) in the eastern portion of the SCWRA (Sundance, 2009). According to Bureau of Land Management (BLM) data in WEMO, the majority of the site is located in low density tortoise habitat that is classified as 1-20 tortoises per square mile (BLM, 2002, Figure C). The 2010 USFWS protocol range boundary map indicates the site is within the desert tortoise range with the cutoff occurring approximately 5 miles to west of the site (USFWS, 2010). Furthermore, recent tortoise & burrowing owl surveys conducted by Sundance for the Sun Creek Wind Energy project in 2009 and incidental observations by WEST and Phoenix, in 2010, indicate low density tortoise populations continue to exist in the SCWRA, within fragmented and isolated areas of preferred habitat (Sundance, 2009; West 2010).

Burrowing Owl

The CNDDB Rarefind 3 database includes two burrowing owl records in proximity: Occurrence #837 (approximately 6.4 miles to the southwest, along the railroad crossing at 90th Street West, 1 adult and 3 juvenile owls were flushed in 2005) & Occurrence #843

(approximately 7.7 miles to the southeast on private land, one adult and one juvenile were sighted at Hwy 14 and United Street; CNDDB, 2010).

Furthermore, in March 2010, WEST biologists documented a burrowing owl within the SCWRA located approximately 1.25 miles east of the 1,288-acre survey area addressed in this report (WEST, 2010).

In summary, the site lies along the western range limits of the desert tortoise in low density tortoise habitat and the site lies within the range of the burrowing owl. There are known occurrences of both species within 1.25-7 miles of the project.

Justification, Methodology and Qualifications:

Due to the fact that the proposed site is located within the range of the desert tortoise and the burrowing owl, suitable vegetation habitat types occur on site, and recent tortoise and owl detections have occurred in the project vicinity (Sundance, 2009; WEST, 2010), protocol surveys were implemented during the 2010 survey period. The surveys began on April 24th to May 5th. Survey methodology incorporated the 1992 United Fish and Wildlife Service (USFWS) *Field Survey Protocol For Any Federal Action That May Occur Within The Range Of The Desert Tortoise (USFWS, 1992)*, the 2010 USFWS desert tortoise protocol, *Preparing For Any Action That May Occur Within The Range Of The Mojave Desert T*ortoise (*Gopherus agassizii, USFWS, 2010*) and the *Burrowing Owl Survey Protocol and Mitigation Guidelines* (CBOC, 1993).

Field surveyors included: David Focardi, Jenny Weidensee, Susan Moore, Erin Whitfield, Josh Utter, Brooks Hart, Rebecca Koller and Brett Blosser. The combined desert tortoise and burrowing owl survey experience of the entire crew is 45 years. Furthermore, all members of the survey crew have completed the desert tortoise handling workshop in Ridgecrest, CA through the Desert Tortoise Council.

The surveys methods consisted of walking 10-meter wide belt transects surveys, using hand-held Garmin GPS units with a 3-5 meter accuracy, within the project footprint in a north to south direction starting approximately a half hour after sunrise and ending no later than a half hour before sunset. Survey teams used hand-held mirrors to view into any potential burrows. During the survey, the surveyors search images included: live tortoises, tortoise

carcasses, scat, eggshell fragments, courtship rings, burrows, burrowing owls, owl feathers, pellets, owl whitewash (scat) and owl vocalizations. Typically, burrowing owl surveys require 30 meter wide belt transects (CBOC, 1993). The surveyors exceeded the standard burrowing owl surveys by incorporating 10 meter wide transects throughout the site. The 10-meter wide transect distance allowed the surveyors to survey for both ground-dwelling species, concurrently, with a high level of confidence in detection. Surveyors average coverage rate was 1.5 miles per hour, with an average daily coverage rate of 30 acres per day, per person. The surveyors did not conduct zone-of-influence transects nor buffer-zone surveys due to private property restrictions. Furthermore, the surveyors did not survey areas that were too steep to safely navigate across. Areas excluded were located in the northwestern portions of Section 32, along Hwy 58, on a slope greater than 100% (Figure G). The steep terrain may provide tortoise habitat but would be expected to function more as a wildlife corridor rather than suitable foraging habitat. The steep terrain is not likely suitable habitat for burrowing owls.

Weather conditions during the survey effort consisted of an unusually cool, windy, wet conditions. Winter rainfall of 2009-2010 was above average and forage availability for tortoises was abundant. Morning and afternoon temperatures were taken each day to ensure surveys were not conducted beyond upper range temperature limits for the desert tortoise.

Field Survey Results:

Desert Tortoise

Desert tortoises were not detected within the project boundary nor were any tortoise sign (scutes, bones, eggshell fragments, drinking depressions or scat) detected on site. Four burrows were detected during the field effort but there was no tortoise sign associated with these burrows. The four burrow detections were considered possible tortoise burrows but no tortoise or recent activity was associated with these burrows. Three of the burrows appeared inactive and in a slightly deteriorated condition with new annual plant growth at the mouth of the burrow. There was also no sign of fresh dirt/digging at the three burrows. The fourth burrow was a rock burrow that was detected while walking to the polygons. The rock burrow was clear of plants and cobwebs but no tortoise sign was present.

Burrowing Owl

Burrowing owls and their sign were absent from the field surveys. Four burrows were detected during the field effort but there was no whitewash, feathers and owl pellets associated with these burrows. No owl vocalizations were detected during the surveys.

All detections along with incidental biological and/or archaeological detections are listed on Table 1 and plotted on Figure A & B. The detections are cross referenced by their occurrence numbers on Table 1.

Table 1: Detections within the 1,288 acre survey for the SCWRA

#	Easting (NAD 83)	Northing (NAD 83)	Date	Location	Sign Type[1]	Condition of Sign[2]	COMMENTS
Potential Desert Tortoise Detections							
1	388843	3885301	4/24/2010	Sun Creek West	4	5	Possible tortoise burrow in deteriorated condition. (225mmX135mmX1.1m). Annual vegetation at entrance. No disturbed soil. No recent activity. Burrow has tortoise shape.
2	388739	3885055	4/24/2010	Sun Creek West	4	5	Possible tortoise burrow in deteriorated condition. (220mmX100mmXunk). Annual vegetation at entrance. No disturbed soil. No recent activity. Entrance collapsed.
3	388343	3884682	4/25/2010	Sun Creek West	4	5	Possible tortoise burrow in deteriorated condition. (265mmX140mmXunk). Burrow has tortoise shape but spoil pile extends too far. No recent activity. Possible badger burrow.
10	385402	3884187	4/30/2010	Sun Creek West	4	5	Rock burrow. ~1 meter deep. Tortoise shape but no tortoise sign. Clean; no annual plants or cobwebs.
Incidental Detections							
4	386914	3885324	4/26/2010	Sun Creek West	Badger	N/A	Round hole (170mmXunk). Freshly disturbed soil covering annual vegetation.
5	387296	3885371	4/26/2010	Sun Creek West	Golden eagle	N/A	One adult golden eagle soaring far above turbines.
6	386316	3885320	4/27/2010	Sun Creek West	Shrike	N/A	Pair of loggerhead shrikes at this point.
7	386249	3885296	4/27/2010	Sun Creek West	Shrike	N/A	Pair of shrike at this point but separate from #6 above. All four adults seen simultaneously.
8	385774	3885184	4/27/2010	Sun Creek West	Shrike	N/A	One shrike sighted flying from shrub.
11	385736	3883836	5/1/2010	Sun Creek West	Arch	N/A	Two metate locations within 20 meters of each other. 3 holes in pinkish, igneous boulder.

Sign Type[1]	Scat=**1**, Carcass=**2**, Live tortoise=**3**, Burrow=**4**, Pallet=**5**, Den=**6**, Eggshell fragment=**7**, Courtship ring=**8**, *Neotoma* midden w/ tortoise sign=**9**, Drinking depression=**10**
Condition of Sign[2]	A) **Burrows:** active=**1**, good condition (no evidence of recent use)=**2**, deteriorated condition (definitely tortoise, half-moon shape)=**3**, good condition(possibly tortoise)=**4**, deteriorated condition (possibly tortoise)=**5**.
	B) **Scat:** wet/fresh=**1**, dried w/ glaze & some odor, dark brown=**2**, dried no glaze & no odor, signs of bleaching, light brown=**3**, dried, light-light brown to pale yellow, loose material=**4**, bleached=**5**
	C) **Shell remains:** fresh=**1**, normal color; scutes adhere to bone=**2**, scutes peeling off bone=**3**, shell bone breaking apart; growth rings on scutes are peeling=**4**, disarticulated and scattered=**5**.

Discussion of Results:

Desert Tortoise

The surveys were negative for live tortoises or tortoise sign. The lack of tortoise sign, in the form of scat, on a year with above-average rainfall, when forage is abundant, gives support to the argument that the site is situated in low density tortoise habitat. Typically, tortoises will deposit more scat on years of abundant forage, thus increasing the probability of detection. However, the irregular shapes of the survey area polygons and lack of contiguous survey areas, creates the possibility for tortoises to exist along the edge of the project and in-between existing polygons. This assertion is supported by tortoise detections in the eastern portion of the SCWRA, in the Horned Toad Hills, during 2009 desert tortoise survey efforts performed by Sundance and incidental detections by Phoenix and West in 2010. The project proponent will likely be required to obtain an incidental take permit for the SCWRA as desert tortoises have been documented in the eastern portion of the SCWRA (Sundance, 2009).

Burrowing Owl

The surveys were also negative for burrowing owls. No owl sign (i.e. feathers, pellets or whitewash) was detected at the four burrows sites. Burrowing owls have been detected in the area and the site is considered potential burrowing owl habitat (CNDDB 2010, West, 2010). However, the 1,288 site is considered unoccupied at this time.

Literature Cited:

Bureau of Land Management.

1998. Surface Management Status Desert Access Guide. California. Desert District Palm Springs. 1:100,000-Scale Topographic Map.

Bureau of Land Management

January 2005. Final Environmental Impact Report and Statement for the West Mojave Plan. Vol. 1A.

Bureau of Land Management

2002. Geographic Information Systems Desert Tortoise Density Layer.

California Burrowing Owl Consortium. Burrowing Owl Survey Procotol and Mitigation Guidelines. April 1993.

California Department of Fish and Game

Rarefind 3 Natural Diversity Database. Habitat and Data Analysis Branch. Sacramento, CA, 2010.

California Department of Fish and Game

Biogeographic Data Branch, California Natural Diversity Database. Species Animals (883) taxa. 2009.

Grinnell, Joseph & Miller, A. H. The Distribution of the Birds of California. Cooper Ornithological Club, 1994.

Sundance Biology, Inc. Executive Summary for Presence/Absence Survey for the Desert Tortoise on the proposed Alta-Oak Mojave Wind Generation Project, June, 2009.

United States Fish and Wildlife Service

January 1992. Field Survey Protocol for any Federal Action that may occur within the range of the Desert Tortoise.

United States Fish and Wildlife Service

Preparing for any action that may occur within the range of the Mojave desert tortoise (*Gopherus agassizii*), 2010.

United States Fish and Wildlife Service

Desert Tortoise Exclusion Fence Specifications, 2005.

(http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/)

Western Ecosystems Technology, Inc. (WEST)

Wildlife Studies for the Sun Creek Wind Resource Area Kern County, California

Winter Interim Report May 2009 - January 2010, May 2010.

This concludes the desert tortoise presence/absence survey and burrowing owl phase IV survey report for the 1,288 acre survey within the SCWRA in eastern Kern County, California.

Certification: *I hereby certify that the statements furnished above and in the attached exhibits present the data and information presented are true and correct to the best of my knowledge and belief. Field work conducted for this assessment was performed by me or under my direct supervision. I certify that I have not signed a non-disclosure or consultant confidentiality agreement with the project applicant or applicant's representative and that I have no financial interest in the project.*

Date: July 14, 2010 Signature: _____

Ryan Young, Senior Biologist & Principal

Figure A: Topographic View of SCWRA & Detections within the 1,288 Acre Survey Area

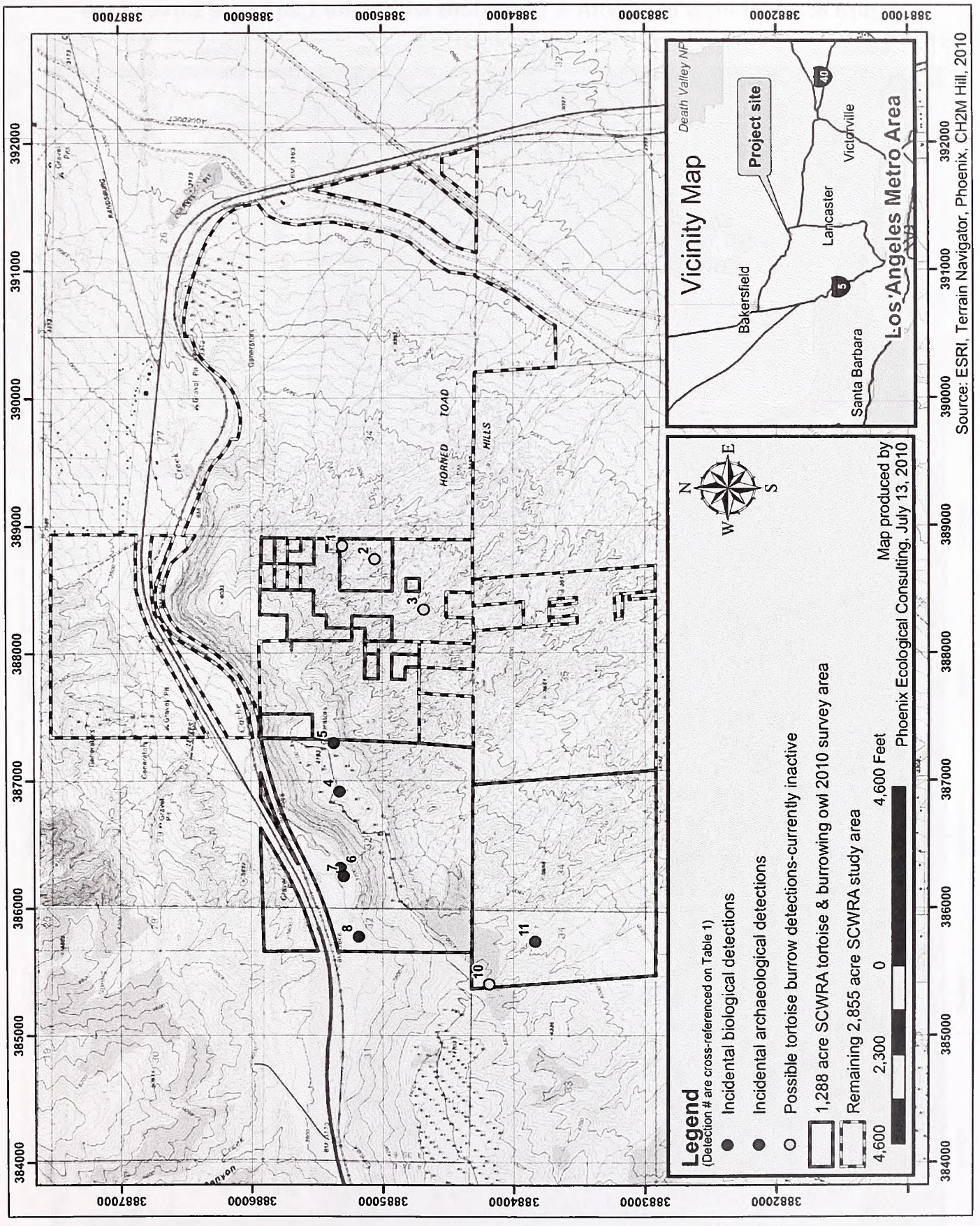


Figure B: Aerial View of SCWRA & Detections within the 1,288 Acre Survey Area

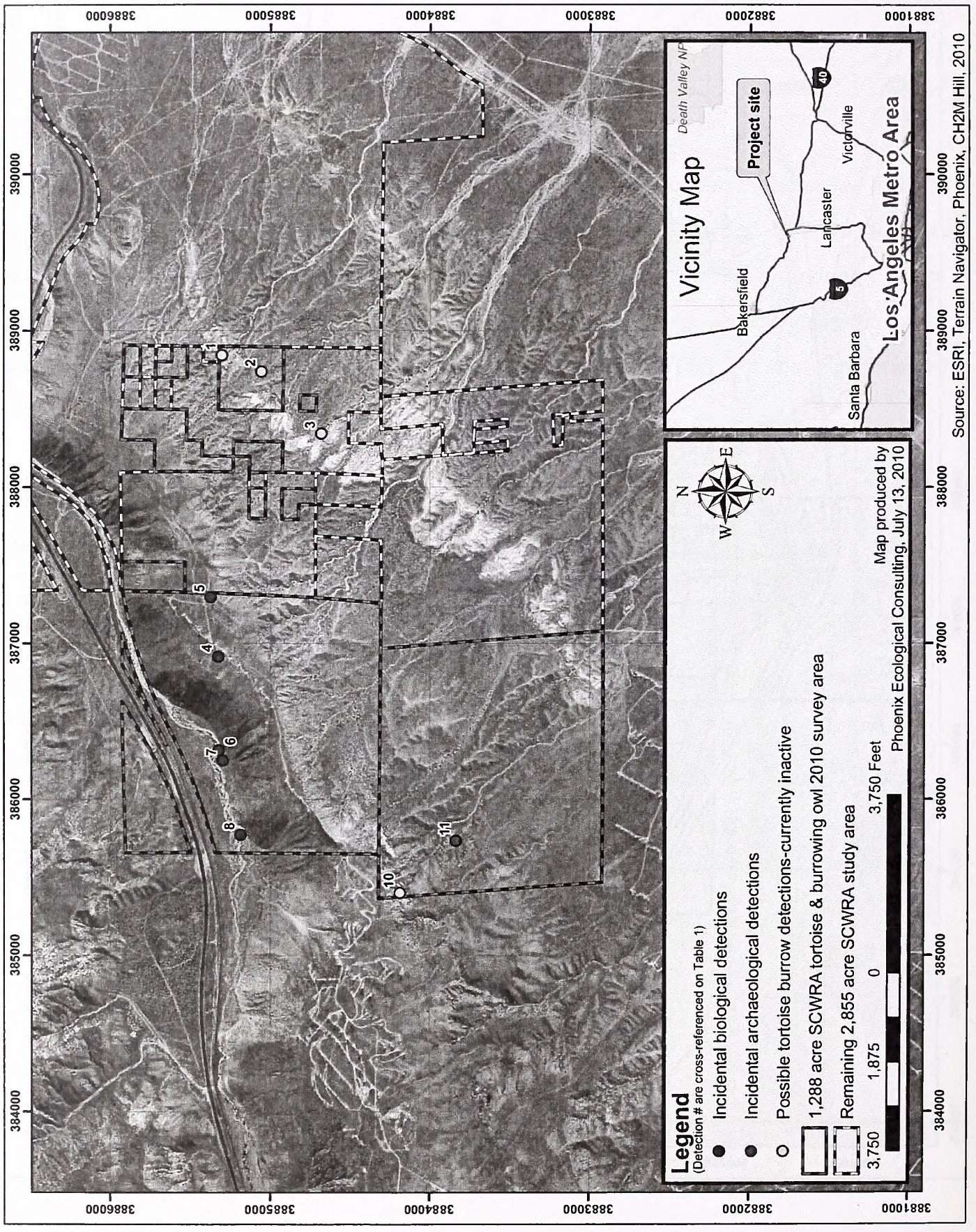


Figure C: Burrowing Owl and Desert Tortoise CNDDB Database & Literature Search Results

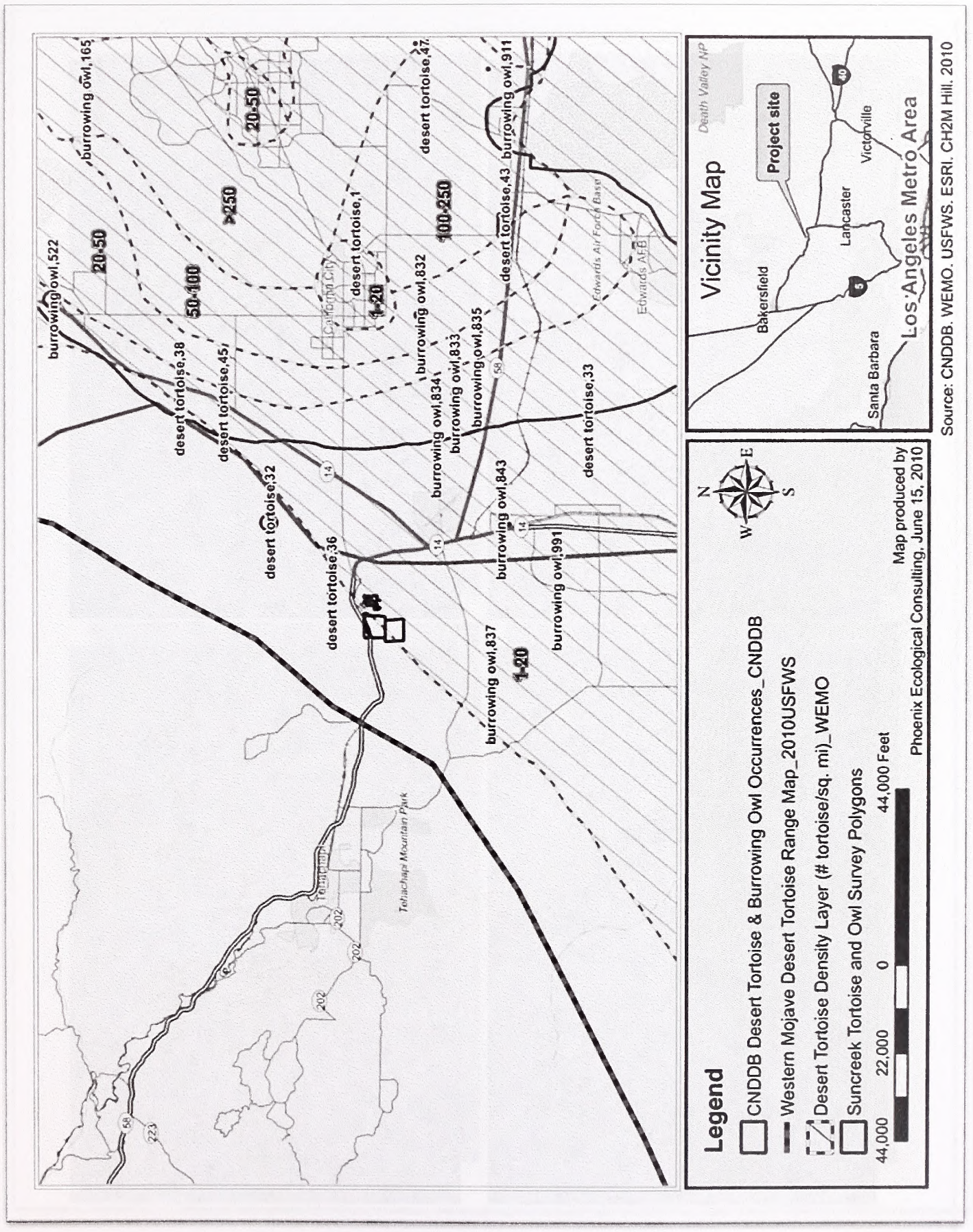


Figure D: Section 32 Habitat Photos

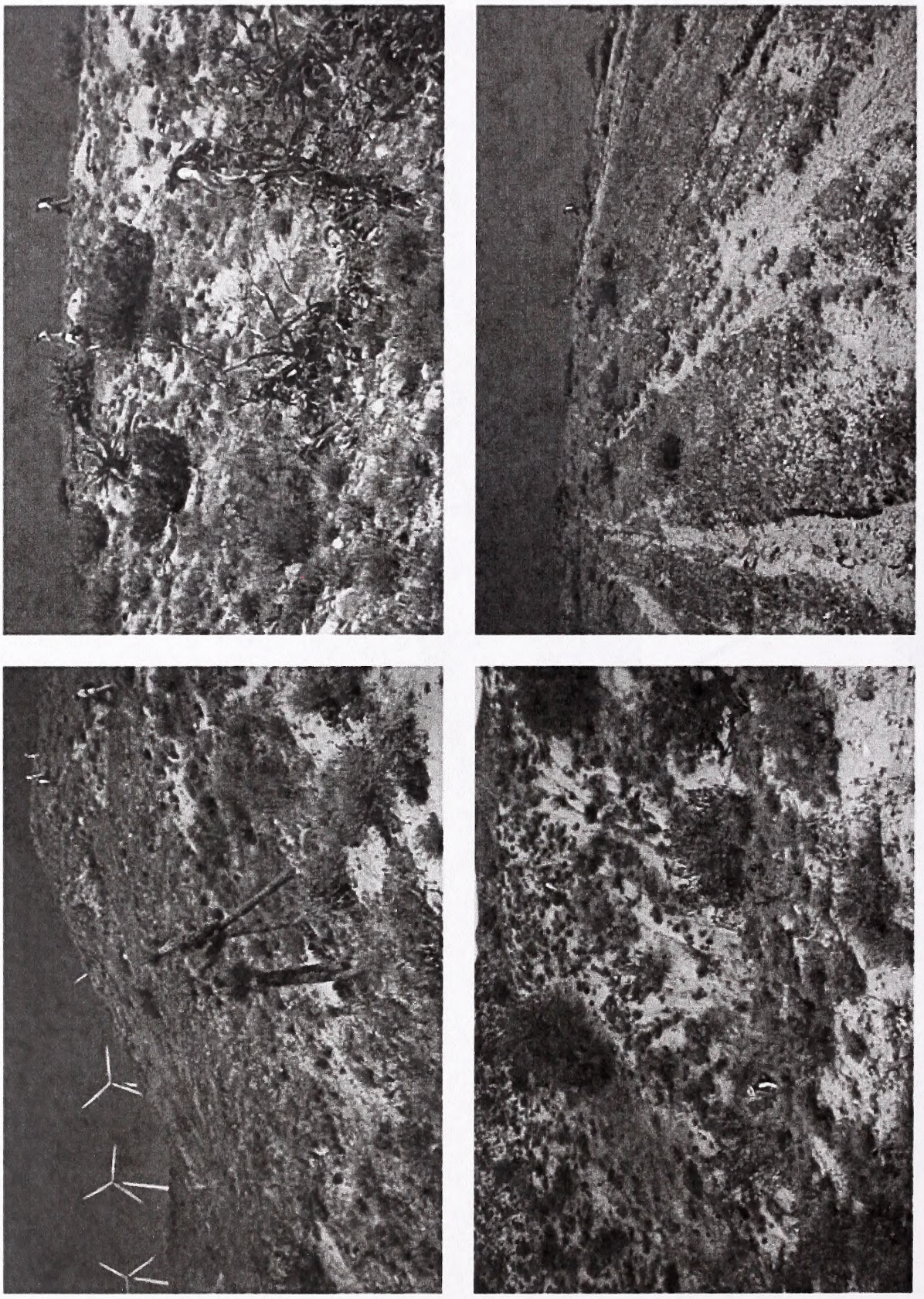


Figure E: Section 33 Habitat Photos

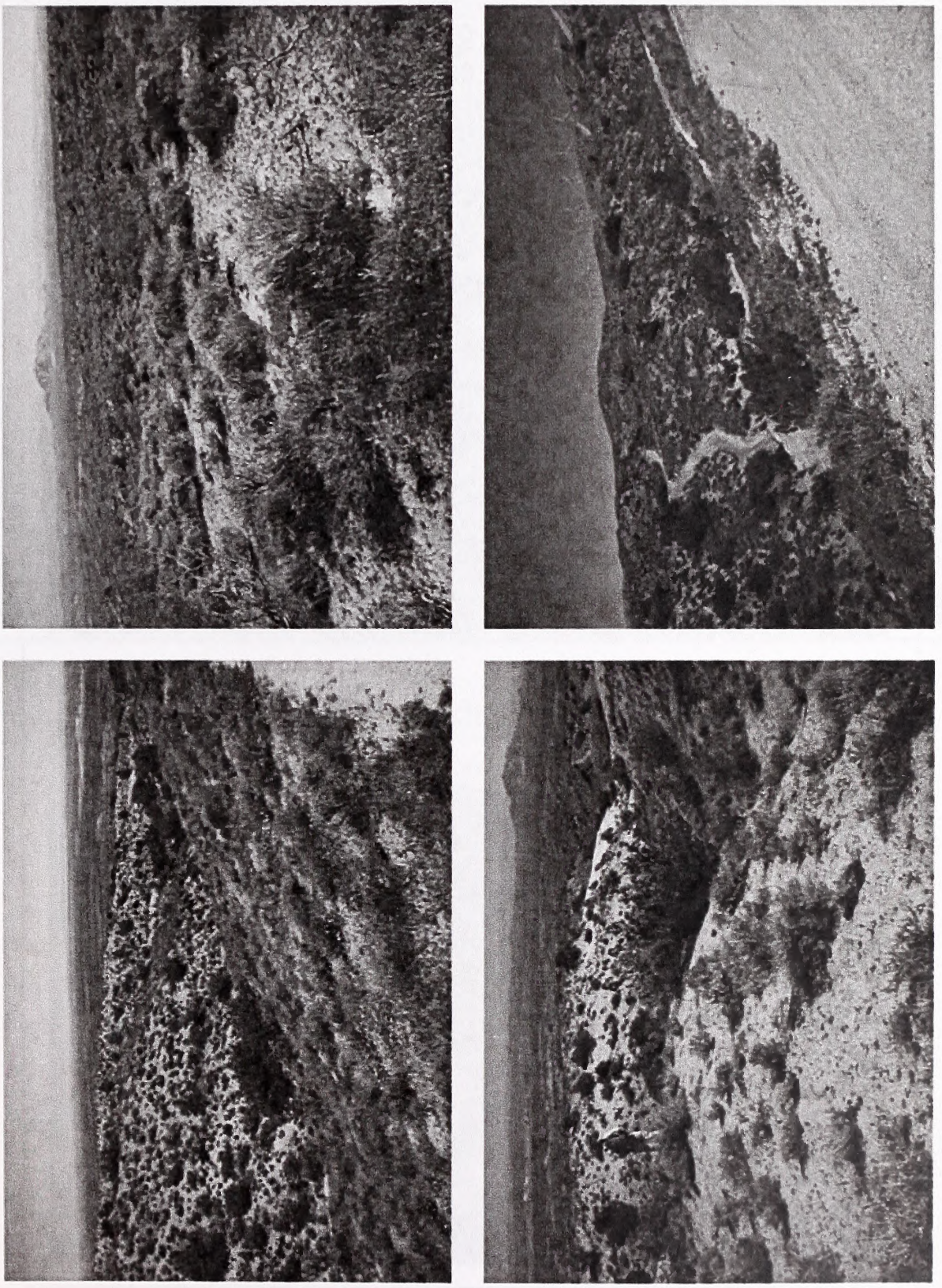


Figure F: Section 34 Habitat Photos

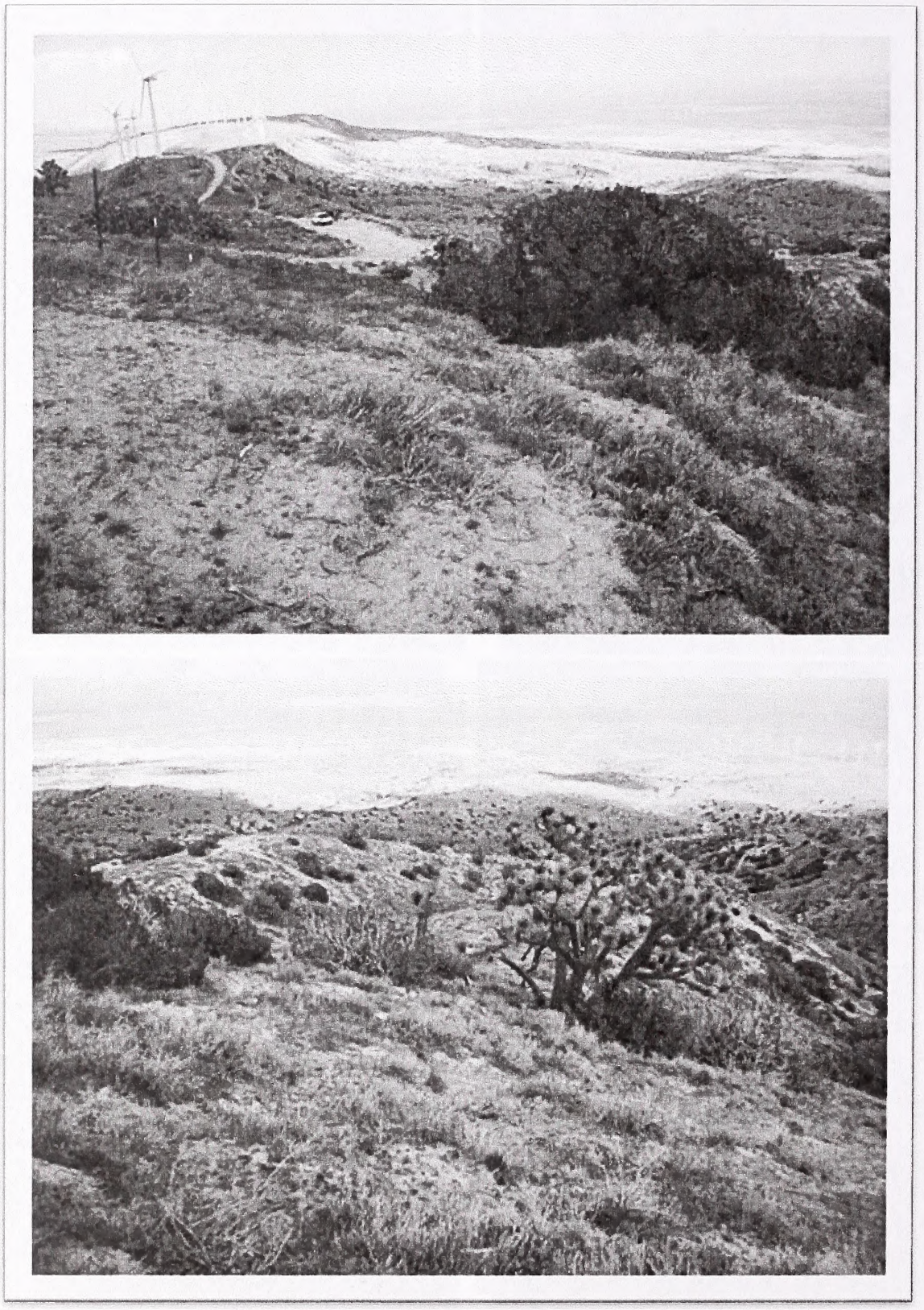


Figure G: Survey Area Excluded Due to Steep Terrain



Table 2: Vertebrates Detected During the SCWRA 1,288 Acre Survey

Mammals
American badger (*Taxidea taxus*)-forage digs
Antelope ground squirrel (*Ammospermophilus leucurus*)
Black tailed jack rabbit (*Lepus californicus*)
California ground squirrel (*Spermophilus beecheyi*)
Coyote (*Canis latrans*)
Desert woodrat (*Neotoma lepida*)
Domestic sheep (*Ovis aries*)-scat only
Kangaroo rat (*Dipodomys sp.*)-scat only
Domestic dog (*Canis familiaris*)
Birds
Ash-throated flycatcher (*Myiarchus nuttingi*)
Bewick's wren (*Thryomanes bewickii*)
Blue-grey gnatcatcher (*Polioptila caerulea*)
Brewer's sparrow (*Spizella breweri*)
Cactus wren (*Campylorhynchus brunneicapillus*)
California quail (*Callipepla gambelii*)
Chipping sparrow (*Spizella passerina*)
Chukar (*Alectoris chukar*)
Cliff swallow (*Petrochelidon pyrrhonota*)
Common Raven (*Corvus corax*)
Gambels quail (*Callipepla gambelli*)
Great egret (*Ardea alba*)
Horned lark (*Eremophila alpestris*)
House finch (*Carpodacus mexicanus*)
Junco, species unknown
Ladder-backed woodpecker (*Picoides scalaris*)
Le Conte's thrasher (*Toxostoma lecontei*)
Lesser goldfinch (*Carduelis psaltria*)
Loggerhead shrike (*Lanus ludovicianus*)
MacGillivray's warbler (*Oporornis tolmiei*)
Mourning dove (*Zenaida macroura*)
Northern harrier (*Cirrus cyaneus*)
Northern mockingbird (*Mimus polyglottos*)
Praire falcon (*Falco mexicanus*)
Red-tailed hawk (*Buteo jamaicensis*)
Sage sparrow (*Amphispiza belli*)
Sage thrasher (*Oreoscoptes montanus*)
Scotts oriole (*Icteru parisorum*)
Scrub jay (*Aphelocoma coerulescens*)
Spotted towhee (*Piplo maculates*)
Tree swallow (*Tachycineta bicolor*)
Turkey vulture (*Cathartes aura*)
Violet-green swallow (*Tachycineta thalasina*)
Western kingbird (*Tyrannus verticalis*)
Western meadowlark (*Sturnella neglecta*)
Western tanager (*Piranga ludoviciana*)
White crowned sparrow (*Zonotrichia leucophrys*)

White-throated swift (*Aeronautes saxatalis*)
Wilson's warbler (*Wilsonia pusilla*)
Yellow-rumped warbler (*Dendroica coronata*)
Reptiles
Desert spiny lizard (*Sceloporus magister*)
Gopher snake (*Pituophis catenifer*)
Long nosed Leopard lizard (*Gambelina wislizenii*)
Night lizard (*Xantusia vigilis*)
Side-blotched lizard (*Uta stansburiana*)
Western whiptail (*Cnemidophorus tigris*)

Table 3: Vascular Plants Detected During the SCWRA 1,288 Acre Survey Area

FAMILY Species	Common Name	Habit
APIACEAE		
Lomatium mohavense	Desert parsley	annual
ASCLEPIADACEAE		
Asclepias vestita	Woolly milkweed	perennial
ASTERACEAE		
Acamptopappus sphaerocephalus	Golden heads	perennial shrub
Ambrosia acanthicarpa	Annual bursage	annual
Ambrosia dumosa	White bur-sage	perennial shrub
Ambrosia salsola	Cheesebush	perennial shrub
Anisocoma acaulis	Scale bud	annual
Artemesia tridentata	Great-basin sagebrush	perennial shrub
Camissonia campestris	Sun cups	annual
Chaenactis fremontii	Fremont pincushion	annual
Chrysothamnus nauseosus	Rubber rabbitbush	perennial shrub
Encelia farinosa	Brittlebush	shrub
Eriastrum sapphrinium.	Unknown eriastrum	perennial
Ericameria cooperii	Golden bush	perennial shrub
Eriophyllum pringlei	Pringle's woolly daisy	annual
Eriophyllum wallacei	Wallace's eriophyllum	annual
Erocameria linearifolia	Interior goldenbush	perennial shrub
Gutierrezia sarothrae	Snakeweed	subshrub
Lasthenia californica	Goldfields	annual
Layia glanulosa	White tidy-tips	annual
Lepidospartum squamatum	Scale broom	perennial
Lessingia lemmonii	Vinegar weed	annual
Malacothrix glabrata	Desert dandelion	annual
Stephanomeria pauciflora	Wire lettuce	annual
Tetradymia axillaris	Cotton thorn	perennial shrub
Xylorhiza tortfolia	Mojave aster	perennial shrub
BORAGINACEAE		
Amsinckia tessellata	Fiddleneck	annual
Cryptantha pterocarya.	Forget-me-not	annual
Pectocarya penicillata		annual
Plagiobothrys sp.	Popcorn flower	annual
BRASSICACEAE		
Arabis pulchra	Prince's rock-cress	perennial
Brassica toumeforti	African mustard	annual
Descurania pinnata	Tansy mustard	annual
Lepidium fremontii	Bush peppergrass	shrub
*Sisymbrium altissimum**	Tumble mustard	annual
*Sisymbrium orientale**	Eastern rocket	annual
Stanleya pinnata	Prince's plume	annual
CACTACEAE		
Opuntia basilaris	Beavertail cactus	perennial

Opuntia echinocarpa	Silver cholla	perennial
CHENOPODIACEAE		
Atriplex canescens	Four wing saltbush	perennial shrub
Grayia spinosa	Spiny hopsage	perennial shrub
Krasheninnikovia lanata	Winterfat	perennial shrub
*Salsola tragus**	Russian thistle	annual
CUCURBITACEAE		
Marah fabaceus	California man-root	perennial
CUPRESSACEAE		
Juniperus californica	California juniper	shrub or tree
EPHEDRACEAE		
Ephedra nevadensis	Mormon tea	perennial shrub
EUPHORBIACAE		
Chamaesyce albomarginata	Rattlesnake weed	annual
FABACEAE		
Astragalus lentiginosus	Milvetch	annual
GERANIACEAE		
*Erodium cicutarium**	Red-stemmed filaree	annual
HYDROPHYLLACEAE		
Nama demissum	Purple mat	annual
Nemophila menziesii	Baby blue-eyes	annual
Phacelia distans		annual
Phacelia fremontii		annual
Pholistoma membranaceum		annual
LAMIACEAE		
Marrubium vulgare	Horehound	perennial
Salazaria mexicana	Bladder sage	
Salvia carduacea	Thistle sage	annual
Salvia columbariae	Chia	
Salvia dorrii	Purple sage	perennial
Salazaria mexicana	Bladder sage	perennial
LILIACEAE		
Calochortus kennedyi	Mariposa lily	annual
Dichelostemma capitatum	Desert hyacinth	annual
Yucca brevifolia	Joshua Tree	Tree
LOASACEAE		
Mentzelia obscura	mentzelia	annual

MALVACEAE		
Eremalche exilis		annual
NYCTAGINACEAE		
Abronia villosa	Desert sand verbena	annual
Mirabilis bigelovii	Wishbone bush	perennial
ONAGRACEAE		
Camissonia campestris	Mojave sun cups	annual
Camissonia claviformis	Brown-eyed primrose	annual
Oenothera sp.	Evening primrose	perennial
PAPERVACEAE		
Escholtzia minutifolia	Small-flowered poppy	annual
POACEAE		
Achnatherum hymenoides	Indian ricegrass	perennial
Achnatherum speciosum	Desert needlegrass	perennial
Bromus madritensis ssp. *rubens**	Red brome	annual
*Bromus tectorum**	Cheat grass	annual
*Schismus arabicus**	Arabian grass	annual
POLEMONIACEAE		
Eriastrum saphirinium.		annual
Gilia latiflora	Broad-flowered gilia	annual
Linanthus dichotomus	Evening snow	annual
Loeseliastrum mathewsii	Desert calico	annual
POLYGONACEAE		
Eriogonum fasciculatum	California buckwheat	perennial
Eriogonum sp.	Unknown buckwheat	annual
Oxytheca perfoliata		annual
Rumex hymenosepalus	Wild-rhubarb	perennial
PORTULACACEAE		
Calandrinia ciliata	Red maids	annual
ROSACEAE		
Purshia tridentata	Antelope bush	shrub
SCROPHULARIACEAE		
Castilleja angustifolia	Desert paintbrush	annual
SOLANAECEAE		
Datura wrightii	Datura	Annual or perennial
Lycium andersonii	Anderson's boxthorn	perennial shrub
Lycium cooperi	Cooper's boxthorn	perennial shrub
ZYGOPHYLLACEAE		
Larrea tridentata	Creosote	shrub

Appendix D-17

Burrowing Owl Survey 2010

Burrowing Owl (*Athene cunicularia*) Protocol Presence/Absence Survey for Sun Creek Wind Resource Area, Kern County, California

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July 19, 2010

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Table 3: Vascular Plants Detected During the SCWRA Surveys	31-33

Executive Summary

At the request of CH2M Hill, Inc., Phoenix Ecological Consulting (Phoenix) initiated burrowing owl (*Athene cunicularia)* protocol surveys within a 992-acre survey area for the Sun Creek Wind Resource Area (SCWRA) project. Protocol methodology adhered to the California Burrowing Owl Consortium's Burrowing Owl Survey Protocol and Mitigation Guidelines (CBOC, 1993). The surveys were conducted during May 30th-July 15th, 2010. The project site consists of rolling hills with relatively undisturbed creosote bush scrub, Joshua-Juniper tree woodlands and Mojave-mixed woody scrub with ephemeral desert washes bisecting the project site.

The survey results were positive for burrowing owl sign, but negative for breeding burrowing owls during the 2010 survey efforts. Burrowing owl whitewash was detected at two burrows. Additionally, twenty-one suitable burrows were detected throughout the project site, but no owl sign (i.e.-pellets, feathers or whitewash) was associated with these burrows. One burrowing owl was incidentally detected on the eastern portion of the project site, during the point count surveys, conducted by Western Ecosystems Technology, Inc. (WEST) on March 19, 2010 (West, 2010); however, this individual was not observed during protocol surveys. Several incidental sensitive species detections occurred during the burrowing owl surveys. These detections included: a live desert tortoise, a prairie falcon, loggerhead shrikes and American badger sign.

Introduction and Purpose:

At the request of CH2M Hill Inc., Phoenix Ecological Consulting (Phoenix) initiated protocol burrowing owl surveys within a 992-acre biological survey area of the project site known as the Sun Creek Wind Resource Area (SCWRA). The entire SCWRA encompasses 4,143 acres. This report addresses the 992-acre biological survey area within the eastern portion of the site (Figure A). The project proponent, Alta Windpower Development, LLC, proposes to install up to 100, 3-MW wind turbines within the project footprint. The project site is located in unincorporated land west-northwest of the town of Mojave, CA. Due to the potential impacts associated with the wind project, phase II and III burrowing owl surveys were conducted to determine if owls are present and to assess alternatives available to mitigate the impacts.

Project Location:

The project site is situated south of highway 58 and the Atchison Topeka & Santa Fe Railroad. The Los Angeles Aqueduct is situated along the eastern edge of the project area. The town of Mojave is approximately 4 miles to the southeast. The project site includes portions of Sections 26-28 and 31-35, Township 32 South, 12 North and Range 35 East, within United States Geological Survey (USGS) 7.5 Series Mojave and Monolith Topographic Quadrangles (Figure A).

Habitat and Land Use:

The project site is situated along a middle-upper bajada with soils ranging from hard-packed granitic alluvium to sandy-loam at lower elevations. The general area is referred to as the Horned Toad Hills on the Mojave 7.5 minute quadrangle topographic map (Figure A). The drainages that bisect the project site tend to flow in a northwest to southeasterly direction.

Soils within existing washes consist of loose sand with low density cobble/pebble matrix. The aspect is southeasterly throughout the project site. The topography ranges from steep hills with a 70-100% slope on the northwestern edge, along Highway 58, to 20-40% slopes along the mid bajada, on the southeastern edge. Representative habitat photos of the polygons are provided in Figures F-G.

The vegetation communities on the site include creosote bush (*Larrea tridentata*)/Bursage (*Ambrosia dumosa*) scrub, Joshua tree woodland (*Yucca brevifolia*), juniper woodland/Mojave-mixed woody scrub and desert riparian wash communities. Dominant perennials include creosote bush (*Larrea tridentata*), Joshua tree (*Yucca brevifolia*), California juniper (*Juniperus californica*), cheesebush (*Ambrosia salsola*), Cooper's goldenbush (*Ericameria cooperii*) and California buckwheat (*Eriogonum fasciculatum*). Dominant annuals include Mojave spurge (*Euphorbia incisa*), filaree (*Erodium cicutarium*), fiddleneck (*Amsinckia tesselata*), *Cryptantha sp.* and distant phacelia (*Phacelia distans).* The entire list of vascular plants and vertebrate species, detected during the burrowing owl surveys, can be found on Table 2 & 3.

The elevation ranges from 3,215 feet, along the southeastern edge, to 4,040 feet along the northwestern edge. The evidence of human disturbance is noticeable within the project footprint in the form of off-highway vehicle (OHV) trails, occasional trash piles, livestock grazing, meteorological stations and abandoned concrete pads that were once associated with wind turbines. There are existing wind turbines located in Section 32, along the ridge of the Horned Toad hills, adjacent to Highway 58.

Burrowing Owl Species Description:

Burrowing owls (*Athene cunicularia*) are small, long-legged, ground-dwelling owls that occur from British Columbia, throughout North America and portions of Central and South America. They winter in the southern latitudes and many remain as year-long residents in

Southern California. At higher elevations and latitudes, they will only occur during breeding seasons. In California, high density owl populations have been documented in agriculture areas in the San Joaquin Valley and Imperial Valleys.

Burrowing owls occur in a variety habitat types throughout California; such as, annual and perennial grasslands, agriculture fields, deserts and scrublands characterized by low-growing vegetation (CBOC, 1993). Suitable owl habitat may also include areas with trees and shrubs where canopy cover is less than 30% of ground surface. Suitable burrows may include both artificial and natural burrows that provide shelter from the elements as well as protection from predators. Burrowing owls also use burrows for nesting during spring and early summer months. The California ground squirrel (CGS; *Spermophilus beecheyi)* is known to provide suitable burrows as well as inactive coyote, kit fox, badger and desert tortoise burrows. Burrowing owls can also create and/or modify existing burrows. Artificial burrows may include culverts, concrete pipes, irrigation boxes, wood debris piles and openings beneath cement or asphalt.

They are most active at night but are also known to be crepuscular (active dawn and dusk). Typical prey items include invertebrates, small mammals, lizards, snakes and small birds. They nest underground in burrows and clutches range between 4-9 eggs. Burrow entrances and nests area may be adorned with cow chips, feathers, grass, trash, food items and dog feces. They are typically monogamous and tend to exist in colonies. They exhibit high nest fidelity and will return to the same burrow nest site for multiple years.

In desert scrub habitat, they are usually associated with canid (i.e.-kit fox and coyote) and CGS burrows along mounds that provide vistas for viewing prey and predators. They are also found along washes and wash banks where small mammal and invertebrate abundance is higher. Burrowing owls are a BLM sensitive species and a California species of special concern. They are also protected under the Migratory Bird Treaty Act (MBTA) and within sections 3503, 3503.5 and 3800 of the California Department of Fish and Game Code which prohibits the take, possession, or destruction of birds, their nests or eggs (CBOC, 1993).

CNDDB Rarefind Database Search Results:

A thorough literature review was conducted prior to the field work to determine the likelihood of burrowing owl encounters within the project footprint. The main database used in compiling known burrowing owl occurrences was the California Natural Diversity Database (CNDDB). There are multiple owl occurrences in the area: (1) Occurrence #837 (approximately 6.2 miles to the southwest, along the railroad crossing at 90th Street West, 1 adult and 3 juvenile owls were flushed in 2005) (2) Occurrence #843 (approximately 6.9 miles to the southeast on private land, one adult and one juvenile were sighted at Hwy 14 and United Street (3) Occurrence #991 (approximately 8.6 miles to the south, one adult was observed at a burrow west of Soledad Mountain; Figure D; CNDDB, 2010). This burrow was also detected during the 2010 owl survey, record #33 on Table 1 & Figure B.

In summary, the project site lies within the range of the burrowing owl. There are known occurrences on the project site and in the CNDDB database from 6.2-8.6 miles south of the project.

Justification, Methodology and Qualifications:

Due to the fact that the proposed project site is located within the range of the burrowing owl, suitable vegetation habitat types occur on site and recent owl detection was documented on the project site (WEST, 210) and within the vicinity, protocol surveys were implemented during the 2010 survey period. The surveys began on May 30th and ended on July 15th. Survey methodology incorporated the *Burrowing Owl Survey Protocol and Mitigation Guidelines* (CBOC, 1993). Field surveyors included: Ryan Young, David Focardi, Jenny Weidensee, Josh Utter and Brooks Hart.

The objective of phase II surveys is to determine if owls are utilizing the site and to record the location of any suitable burrows or owl sign within the project site. The phase II survey methods consisted of walking twenty meter wide belt transects surveys, using hand-held Garmin GPS units with a 3-5 meter accuracy, within the project footprint, in a north to south direction, starting approximately a half hour after sunrise and ending no later than a half hour before sunset. The survey protocol generally recommends thirty meter wide belt transects.

However, due to the amount of vegetation cover on the site the transect width was decreased in order to increase the potential detection probability. During the survey, the surveyors search images included: burrows, burrowing owls, owl feathers, pellets, owl whitewash, owl vocalizations and other avian species. The surveyors' average coverage rate was 1.5 miles per hour, with an average daily coverage rate of 50 acres per day per person. The surveyors recorded any burrowing owl sign or incidental sensitive species encountered onto field forms. The field data recorded included type of sign, species associated with sign, UTM coordinates, date, photos, time and description of sign.

The objective of the phase III surveys is to document the owl behavior, territory size, number of owls and distribution of burrowing owls throughout the project site. The phase III surveys involved re-visiting all portions of the site on four separate occasions. All known burrow locations were re-visited to determine if owls were present and/or if any new burrowing owl sign had been deposited. Vehicular surveys were also conducted during the phase III surveys by driving along existing dirt roads, within the project site, and stopping every 300 meters to scan the vegetation canopy for owls while playing burrowing owl vocalizations to elicit a response. The call broadcast survey method has been demonstrated to increase detection probability (Conway, C. J., et. al, 2008; Duxbury, 2008; Klute, D.S. et. al, 2003). It was incorporated into the phase III survey efforts to increase the potential for detecting any owls that were missed and/or moved onto the site since the phase II survey effort was completed.

Weather conditions during the survey effort consisted of below average temperatures for May and June (50-80 degrees Fahrenheit). July temperatures ranged from 75-100 degrees Fahrenheit. As would be expected within a wind resource area, the site received daily winds ranging from 10 to 40 MPH. Survey conditions above 20 MPH were avoided, per protocol. Morning and afternoon temperatures were taken each day to ensure surveys were conducted within suitable survey parameters for burrowing owls.

Field Survey Results:

Burrowing owl detections

The phase II burrowing owl surveys were positive for burrowing owl sign. A total of two burrows had whitewash present, which was deposited over the previous year based on degree of fading and rate of deterioration. The one burrow, located in polygon C, appeared to be an abandoned badger burrow situated in a north-facing slope in creosote scrub. There was abundant whitewash deposited along the burrow apron, suggesting an owl had been present for several months (Figure B & E). There were also three owl pellets deposited at the burrow. The other burrow was located in polygon A along the bank of a wash. The whitewash associated with this burrow was minimal, suggesting an owl was present for one to two months. The wash in polygon A receives regular OHV traffic on the weekends. There were no burrowing owls sighted during the survey. However, one burrowing owl was incidentally detected by WEST, at the burrow location mentioned above in polygon A, on March 19, 2010, during point count surveys (Table 1, Figure B). The phase III surveys were negative for any additional burrowing owl detections.

Incidental detections

During the phase II and III surveys there were several incidental special-status species detected: desert tortoise (*Gopherus agassizii*), American badger (*Taxidea taxus*) sign, prairie falcon (*Falco mexicanus*), loggerhead shrikes (*Lanius ludovicianus*). One adult male tortoise was detected in polygon E at the mouth of a burrow on June 2nd. There were also seven pieces of tortoise scat, one carcass, five class I-II tortoise burrows, and two sets of tortoise tracks detected. The desert tortoise is a state and federally threatened species. There were twenty-six American badger burrows/forage holes detected. This species is a state species of special concern. One prairie falcon was sighted hunting over section 34 near a meteorological tower. The falcon was observed for approximately 10 minutes. Prairie falcons are a California Department of Fish and Game Watch List species, United States Fish and Wildlife Service Birds of Conservation Concern and protected under the MBTA. Four loggerhead shrikes were detected during the burrowing owl surveys. The shrikes were sighted during the breeding season and it is assumed they breed on site. Shrikes are a state species of special concern (nesting) and they are protected under the MBTA.

All detections along with incidental biological detections are listed on table 1 and plotted on figure B & C. The detections are cross referenced by their record numbers on table 1. All GPS locations are in UTM NAD 83 datum.

Table 1: Detections for the SCWRA 992 Acre Survey Area

RECORD	EASTING	NORTHING	SIGN TYPE	SPECIES	DATE	DESCRIPTION
33	390986	3885488	Burrow with whitewash	**Burrowing Owl**	6/2/2010	Burrowing owl burrow in wash bank. Several whitewash along entrance. Inactive. Polygon A. Rechecked on 06/27/10 & 07/05/10. No new owl sign. No owl sighted. Photo taken. West detected an owl at this location in March, 2010.
46	389387	3884559	Burrow with whitewash	**Burrowing Owl**	5/31/2010	Burrowing owl sign in (possible) old badger burrow. Abundant whitewash at burrow entrance. Two old pellets. One fresh pellet. Polygon C. Rechecked on 06/26/10 & 07/05/10. No new owl sign. No owl seen/heard. Photo taken.
7	389145	3884513	Burrow	Tortoise	5/31/2010	Tortoise burrow. Class I. Fresh tracks. 300mm widex120 mm high x unk. Polygon E. Rechecked 06/26/10. No owl sign.
28	390453	3886433	Burrow	Tortoise	6/1/2010	Tortoise burrow. 61 mm wide x 85 mm tall. Class IV-V. Polygon C. Rechecked 06/26/10. No owl sign.
34	388296	3886245	Burrow	Tortoise	6/2/2010	Tortoise burrow. Class II. 200mm wideX100 mm tall. Recent use. Rechecked 07/05/10. No owl sign.
47	389002	3884547	Burrow	Tortoise	6/26/2010	Tortoise burrow. Class 5. ~330 mm wide. Annuals in front of burrow. Debris in entrance. End not visible. Rechecked on 07/05/10. No owl sign.
3	389333	3884520	Burrow	Tortoise & Badger	5/31/2010	Three badger forage holes and one tortoise burrow. Class II. Rechecked 06/26/10. No owl sign.
2	391375	3886099	Burrow	Badger	5/31/2010	Badger forage hole. Recent. Rechecked 06/26/10. No owl sign.
14	388880	3884549	Carcass	Tortoise	6/1/2010	Tortoise carcass. Male. Class V. Edge of Polygon C. Photo taken.
12	388988	3884661	Scat	Tortoise	6/1/2010	Tortoise scat. Fresh. Class II. Polygon C. Photo taken.
15	388973	3884711	Scat	Tortoise	6/1/2010	Tortoise scat. 2 pieces. 1 cm wide x 4 cm long. Class II.
26	388842	3884611	Scat	Tortoise	6/1/2010	Tortoise scat. Fresh. Class II.
27	389434	3885311	Scat	Tortoise	6/1/2010	Tortoise scat. Fresh. 20mm widex55mmlong. Class I.
38	388437	3886035	Scat	Tortoise	6/2/2010	Tortoise scat. 18 mm wide. 1+ year old.
39	388439	3886038	Scat	Tortoise	6/2/2010	Tortoise scat. Class II.
40	388436	3886040	Scat	Tortoise	6/2/2010	Two pieces of tortoise scat. Class II. Two more pieces 1 meter away.
37	388433	3886029	Tortoise	Tortoise	6/2/2010	Adult male tortoise in shallow burrow. 260 MCL. 200 mm wide. LM 9 + 10 show healed trauma. V2 + 3 sunken. Photo taken.
20	389459	3885304	Tracks	Tortoise	6/1/2010	Fresh tortoise tracks. Recent. Outside width ~210 mm (adult).

21	389445	3885310	Tracks	Tortoise	6/1/2010	Tortoise tracks. 210 mm wide (adult). Recent.
4	389262	3884449	Burrow	Badger	5/31/2010	Badger forage hole. Recent activity. Rechecked 06/26/10. No owl sign.
5	390091	3885579	Burrow	Badger	5/31/2010	Multiple badger forage holes. Rechecked 06/26/10. No owl sign.
6	390384	3885920	Burrow	Badger	5/31/2010	Badger forage hole. Rechecked 06/26/10. No owl sign.
8	389070	3884572	Burrow	Badger	5/31/2010	Badger forage hole. Rechecked 06/26/10. No owl sign.
10	389415	3885138	Burrow	Badger	6/1/2010	Several badger forage holes. Rechecked 06/26/10. No owl sign.
11	389211	3884905	Burrow	Badger	6/1/2010	Several badger forage holes. Rechecked 06/26/10. No owl sign.
13	388946	3884550	Burrow	Badger	6/1/2010	Several badger forage holes. Rechecked 06/26/10. No owl sign.
16	388950	3884777	Burrow	Badger	6/1/2010	Badger burrow. End not visible. Rechecked 06/26/10. No owl sign.
17	389001	3884792	Burrow	Badger	6/1/2010	Several badger forage holes. Rechecked 06/26/10. No owl sign.
18	389038	3884885	Burrow	Badger	6/1/2010	Badger burrow. End not visible. Forage holes. Rechecked 06/26/10. No owl sign.
19	389119	3884995	Burrow	Badger	6/1/2010	Several badger forage holes. Rechecked 06/26/10. No owl sign.
24	389386	3886072	Burrow	Badger	6/1/2010	Old badger forage holes. ~10-20 holes. Rechecked 06/26/10. No owl sign.
25	389243	3885910	Burrow	Badger	6/1/2010	Several badger forage holes. Rechecked 06/26/10. No owl sign.
30	389800	3886067	Burrow	Badger	6/2/2010	Badger burrow. End not visible. Rechecked 06/27/10. No owl sign.
31	390071	3885048	Burrow	Badger	6/2/2010	Badger foraging hole. Rechecked 06/27/10. No owl sign.
32	388715	3886211	Burrow	Badger	6/2/2010	Badger foraging hole. Rechecked 06/27/10. No owl sign.
35	388478	3886343	Burrow	Badger	6/2/2010	Badger burrow. End not visible. Rechecked 07/05/10. No owl sign.
36	388497	3886286	Burrow	Badger	6/2/2010	Badger burrow. End not visible. Forage hole nearby. Rechecked 07/05/10. No owl sign.
41	390784	3886097	Burrow	Badger	6/2/2010	Badger forage hole. Rechecked 07/05/10. No owl sign.
42	389573	3884390	Burrow	Badger	6/2/2010	Several badger forage holes. Rechecked 07/05/10. No owl sign.
43	389949	3884853	Burrow	Badger	6/2/2010	Several badger forage holes. Rechecked 07/05/10. No owl sign.
44	389832	3884413	Burrow	Badger	6/2/2010	Several badger forage holes. Rechecked 07/05/10. No owl sign.
45	389948	3884565	Burrow	Badger	6/2/2010	Several badger forage holes. Rechecked 07/05/10. No owl sign.
49	389299	3885941	Burrow	Badger	7/5/2010	Two badger forage holes. No owl sign. Rechecked on 07/10/2010.
59	390372	3886219	N/A	Prairie falcon	6/26/2010	Prairie falcon sighted hunting along ridge in Section 34, near met tower. Falcon remained in area for 12 minutes.
1	390873	3884591	N/A	Loggerhead shrike	5/30/2010	Shrike sitting in Joshua tree. One bird sighted.

9	389685	3885429	N/A	Loggerhead shrike	6/1/2010	One loggerhead shrike on Joshua tree.
22	390141	3886125	N/A	Loggerhead shrike	6/1/2010	One shrike on a Joshua tree.
23	389744	3886184	N/A	Loggerhead shrike	6/1/2010	One shrike in creosote.
29	389293	3886107	Burrow	Coyote	6/1/2010	Active coyote den. Rechecked 06/26/10. Recent coyote tracks. No owl sign.
48	390590	3886351	Shelter	N/A	6/26/2010	Concrete slab with suitable owl shelter underneath. Rechecked 07/10/2010. No owl sign.
50	391274	3885956	Shelter	N/A	7/5/2010	Concrete slab with suitable owl shelter underneath. Rechecked 07/10/2010. No owl sign.
51	391276	3886218	Shelter	N/A	7/5/2010	Concrete slab with suitable owl shelter underneath. A few whitewash on nearby rock. Species undetermined. Rechecked 07/10/2010. No new sign.
52	391013	3885903	Shelter	N/A	7/5/2010	Concrete slab with suitable owl shelter/burrow underneath. Rechecked 07/10/2010. No owl sign.
53	391118	3886323	Shelter	N/A	7/5/2010	Concrete slab with suitable owl shelter/burrow underneath. Rechecked 07/11/2010. No owl sign.
54	391017	3886328	Shelter	N/A	7/5/2010	Concrete slab with suitable owl shelter/burrow underneath. Rechecked 07/11/2010. No owl sign.
55	390914	3886102	Shelter	N/A	7/5/2010	Concrete slab with suitable owl shelter/burrow underneath. Rechecked 07/11/2010. No owl sign.
56	390795	3886087	Shelter	N/A	7/5/2010	Concrete slab with suitable owl shelter/burrow underneath. Rechecked 07/11/2010. No owl sign.
57	390783	3886292	Shelter	N/A	7/5/2010	Concrete slab with suitable owl shelter/burrow underneath. Rechecked 07/11/2010. No owl sign.
58	390591	3886119	Shelter	N/A	7/5/2010	Concrete slab with suitable owl shelter/burrow underneath. Rechecked 07/11/2010. No owl sign.

Discussion of Results:

Burrowing owl sign was detected during the survey. However, no breeding burrowing owls were encountered during the survey effort. One burrowing owl was incidentally detected in polygon A during a point count survey in March 2010 by WEST. Based on this information, the site would be considered occupied burrowing owl habitat. The amount of sign associated with the burrow in polygon C, record #46, suggests the owl was present for several months. The owl may have been a migrating or wintering owl. The owl sighted by WEST in polygon A, record #33, was detected during March. The burrow location had minimal whitewash, which suggests the owl was present for approximately 1-2 months at this location. Given the time of year, the owl may have been migrating through the site or it was an unmated bird attempting to find a mate. Based on the distance between the two known owl burrows, it is likely these are two separate individuals usingseparate territories.

The possibility of burrowing owls returning to the site and/or breeding on the site is a possibility. Currently, the Mojave Desert is experiencing an increase in rodent populations due to above average rainfall in 2009-2010, which suggests predator populations, such as coyote, kit fox, rattlesnakes and birds of prey, are on the rise as well (R. young, pers. observ.). Burrowing owl populations in the desert may continue to expand over the next 1-2 years. Due to the presence of owl sign within the project area, the site provides suitable habitat and breeding owls may use the site in the future if surrounding owl populations expand into the area.

Literature Cited:

Barclay, J.H., K.W. Hunting, J. L. Lincer, J. Linthicum and T. A. Roberts. 2007. Proceedings of the California Burrowing Owl Symposium, November 2003. Bird Populations Monographs No.1. the Institute for Bird Populations and Albion Environmental. Point Reyes Station, CA, vii + 192 pp.

Bureau of Land Management

January 2005. Final Environmental Impact Report and Statement for the West Mojave Plan. Vol. 1A.

California Burrowing Owl Consortium. Burrowing Owl Survey Protocol and Mitigation Guidelines. April 1993.

California Department of Fish and Game

Rarefind 3 Natural Diversity Database. Habitat and Data Analysis Branch. Sacramento, CA, 2010.

California Department of Fish and Game

Biogeographic Data Branch, California Natural Diversity Database. Species Animals (883) taxa. 2009.

Conway, C.J., Garcia, V., Smith, M.D., Hughes, K. Factors Affecting Detection of Burrowing Owl Nests During Standardized Surveys. Journal of Wildlife Management 72(3):688-696; 2008.

Duxbury, J. M., and G. L. Holroyd. 1998. Testing a possible standardized, road-side survey technique for Burrowing Owls. Abstract and notes. Second International Burrowing Owl Symposium, Ogden, Utah.

Grinnell, Joseph & Miller, A. H. The Distribution of the Birds of California. Cooper Ornithological Club, 1994.

Klute, D. S., L. W. Ayers, M. T. Green, W. H. Howe, S. L. Jones, J. A. Shaffer, S. R. Sheffield, and T. S. Zimmerman. 2003. Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States. U.S. Department of Interior, Fish and Wildlife Service, Biological Technical Publication FWS/BTP-R6001-2003, Washington, D.C.

Shuford, W.D., Gardali, T. 2008. California Bird Species of Special Concern: A Ranked assessment of species, subspecies and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California and California Department of Fish and Game, Sacramento.

Sundance Biology, Inc. Executive Summary for Presence/Absence Survey for the Desert Tortoise on the proposed Alta-Oak Mojave Wind Generation Project, June, 2009.

Western Ecosystems Technology, Inc. (WEST)

Wildlife Studies for the Sun Creek Wind Resource Area Kern County, California Winter Interim Report May 2009 - January 2010, May 2010.

This concludes the burrowing owl phase IV survey report for the 992-acre biological survey corridor within the eastern portion of the SCWRA.

Certification: *I hereby certify that the statements furnished above and in the attached exhibits present the data and information presented are true and correct to the best of my knowledge and belief. Field work conducted for this assessment was performed by me or under my direct supervision. I certify that I have not signed a non-disclosure or consultant confidentiality agreement with the project applicant or applicant's representative and that I have no financial interest in the project.*

Date: July 29, 2010 Signature: _____

Ryan Young, Senior Biologist & Principal

Figure A: Topographic View of the SCWRA Project Site and Burrowing Owl Survey Polygons

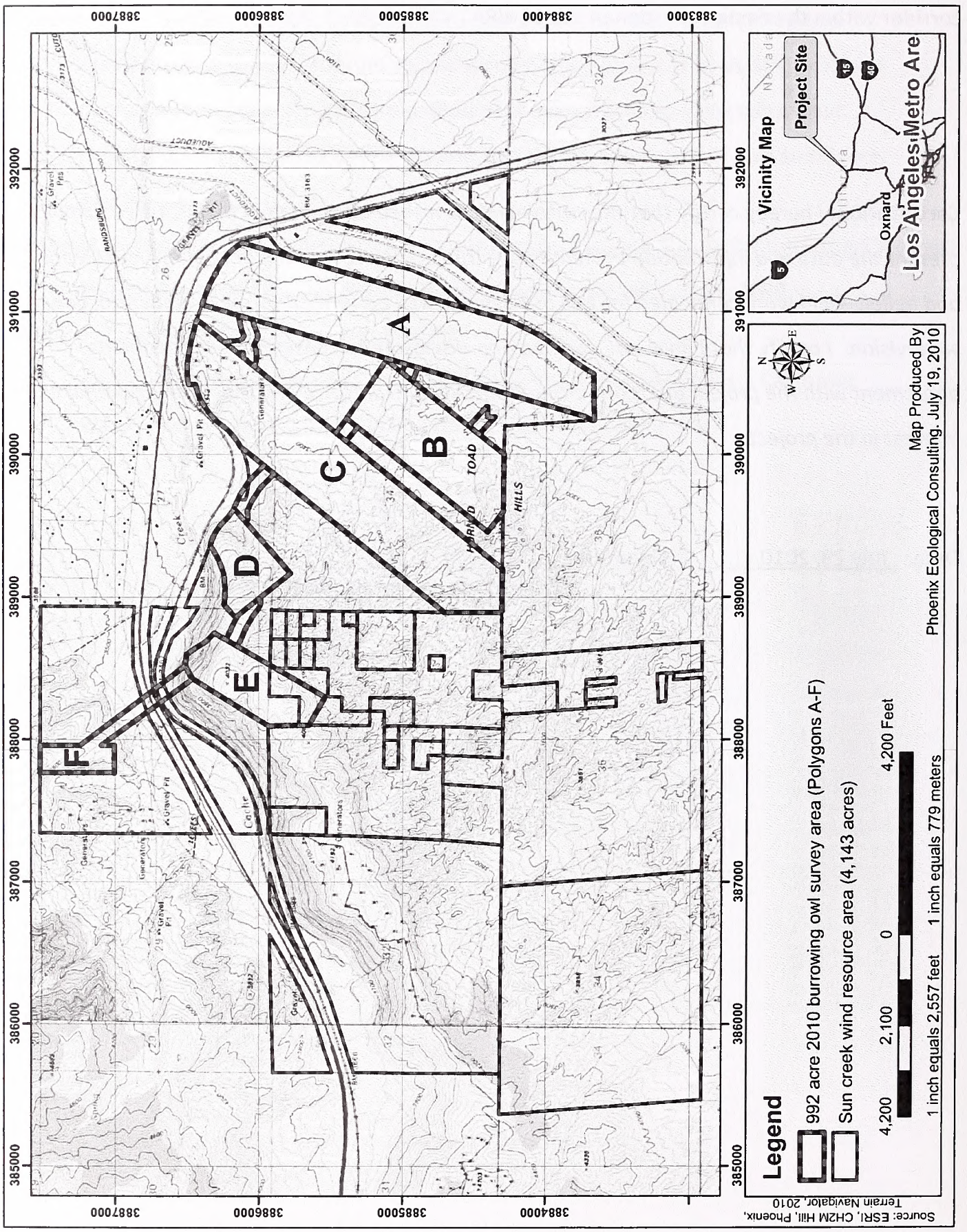


Figure B: Aerial View of 992-Acre Survey Area, Suitable Burrows and Owl Burrows

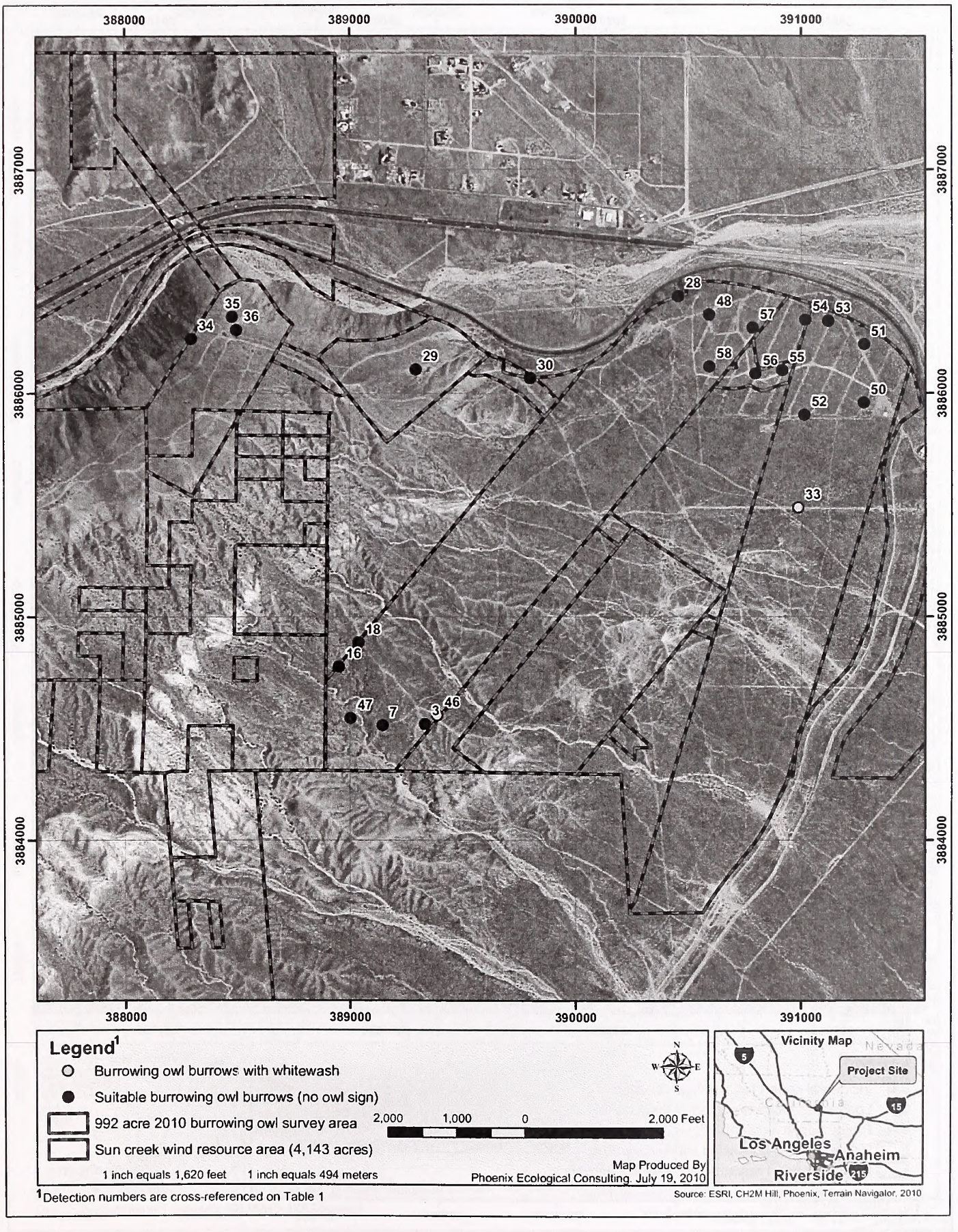


Figure C: Aerial View of 992 Acre Survey Area and Incidental Detections

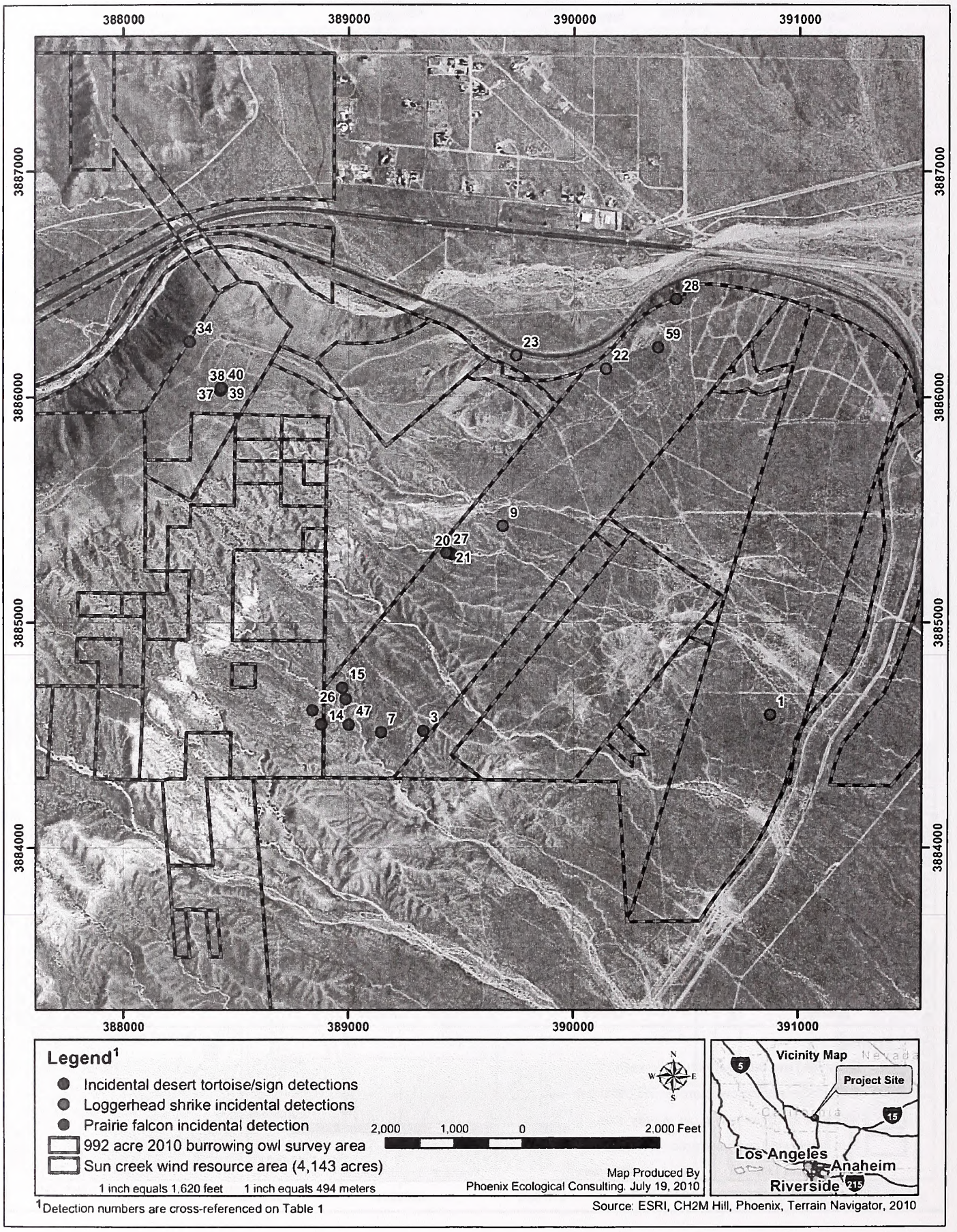


Figure D: CNDDB Burrowing Owl Occurrences for SCWRA

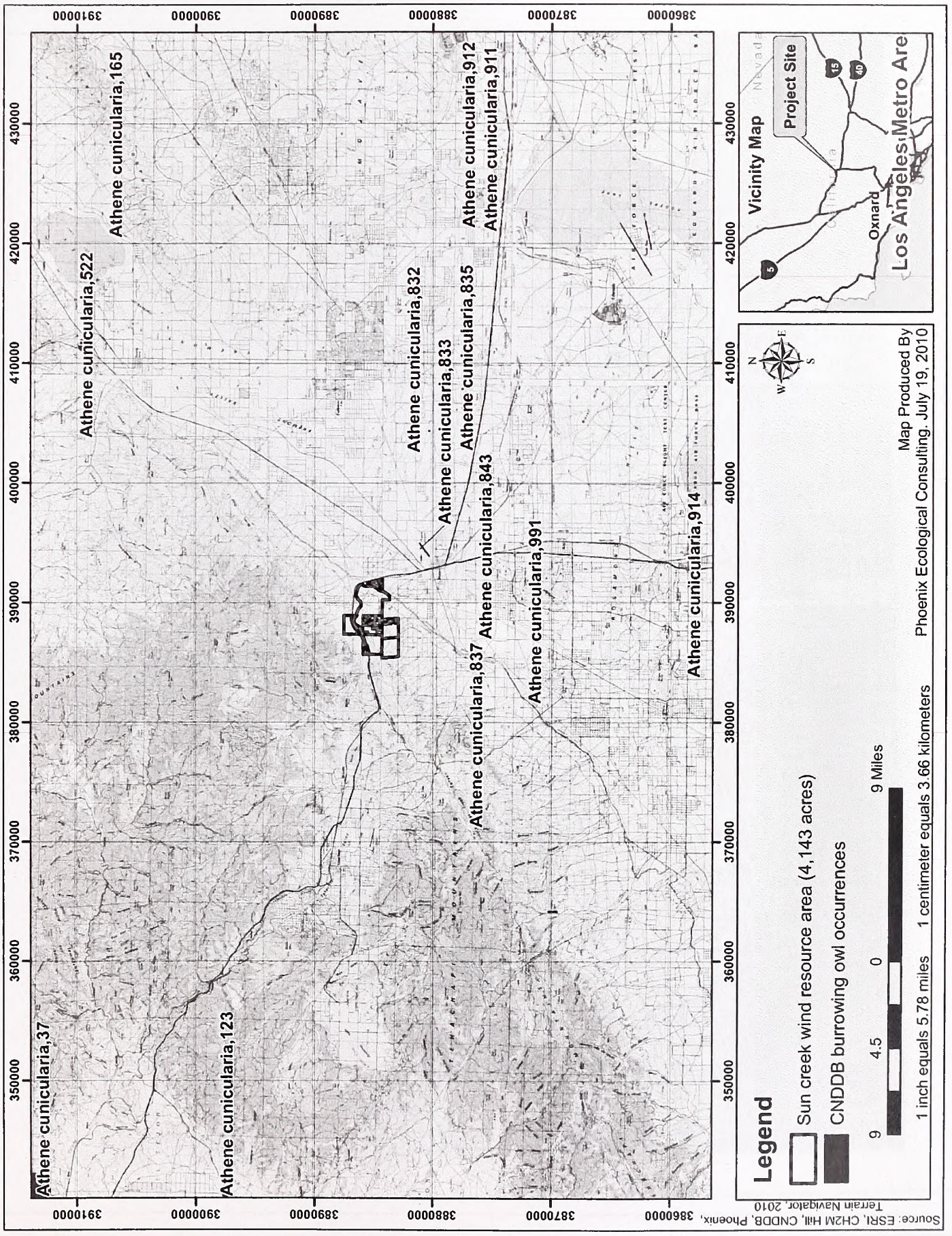
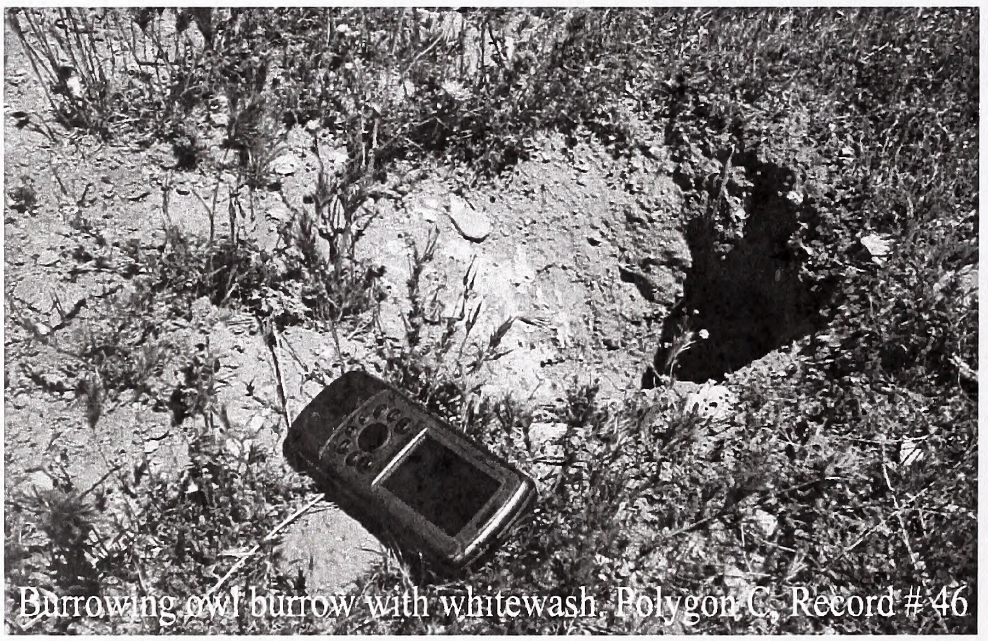


Figure E: Photos of Burrowing Owl Sign



Burrowing owl burrow with whitewash -Polygon A, Record # 33



Burrowing owl burrow with whitewash, Polygon C, Record # 46

Figure F: Habitat Photos of Polygon A-D

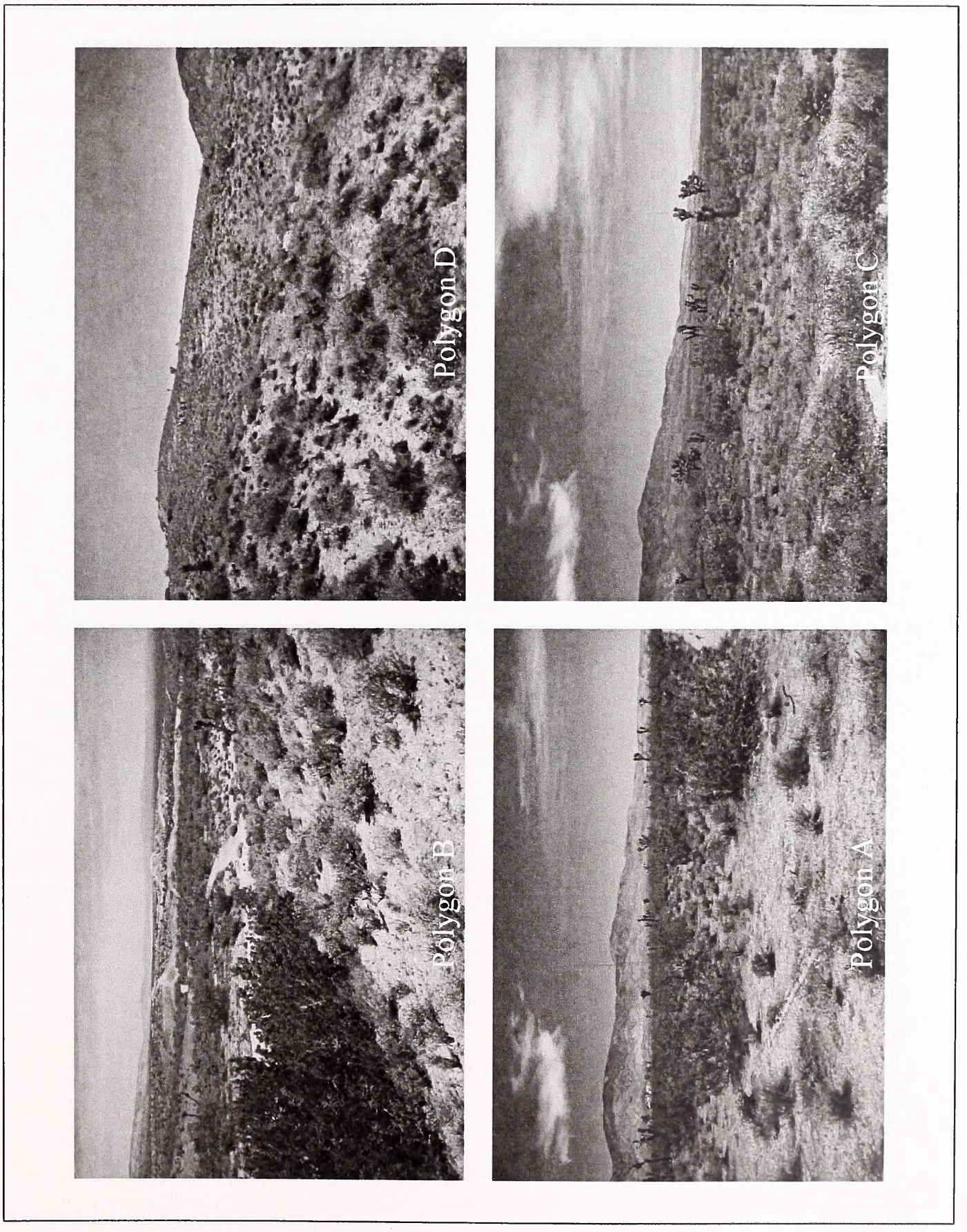
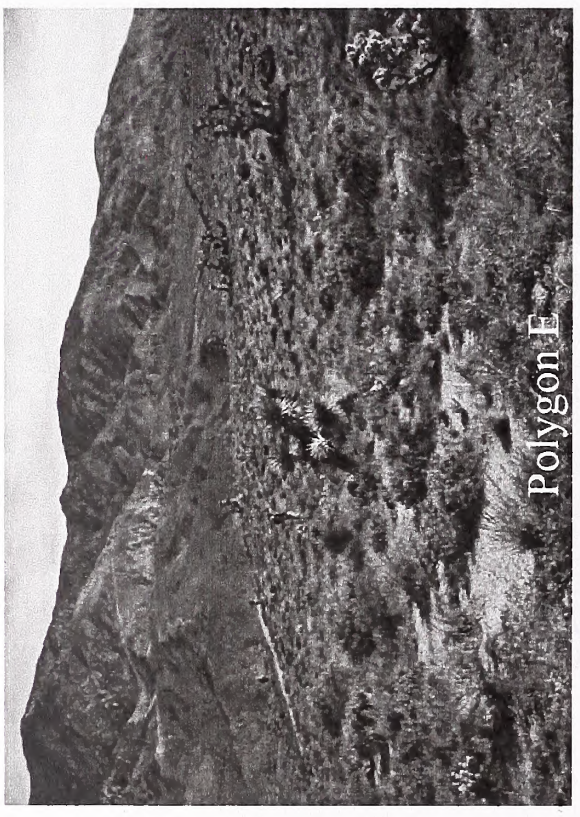


Figure G: Habitat Photos of Polygon E-F



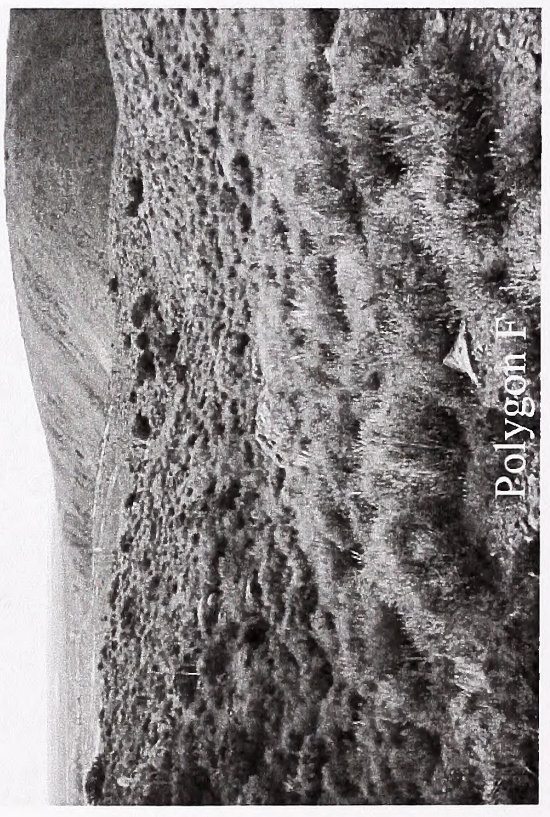
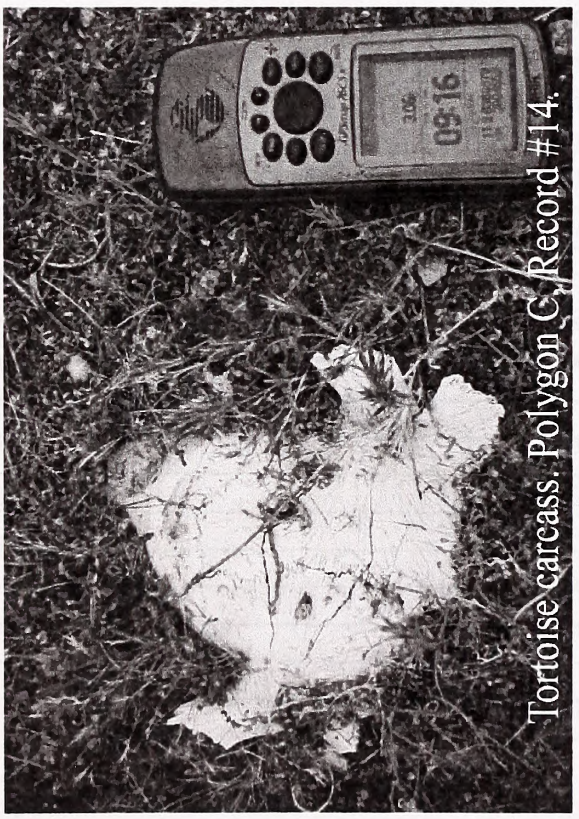


Figure H: Incidental Tortoise/Sign Detection Photos


Tortoise scat. Polygon C, Record #12.


Tortoise burrow. Polygon C, Record #28.


Tortoise carcass. Polygon C, Record #14.

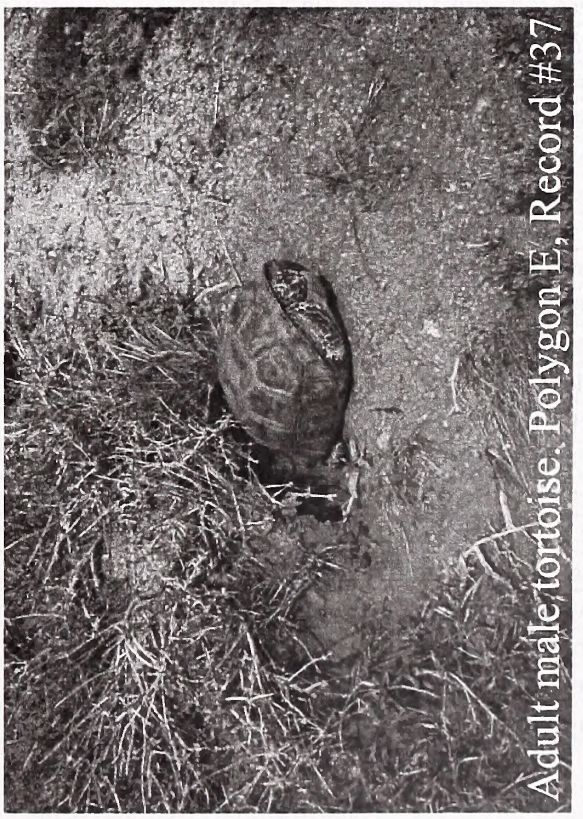

Adult male tortoise. Polygon E, Record #37

Table 2: Vertebrates Detected During the SCWRA Surveys

Mammals
American badger (*Taxidea taxus*)
Antelope ground squirrel (*Ammospermophilus leucurus*)
Black tailed jack rabbit (*Lepus californicus*)
California ground squirrel (*Spermophilus beecheyi*)
Coyote (*Canis latrans*)
Desert woodrat (*Neotoma lepida*)
Merriam's Kangaroo rat (*Dipodomys merriami)*
Birds
Ash-throated flycatcher (*Myiarchus nuttingi*)
Black throated sparrow (*Amphispiza bilineata*)
Burrowing owl (*Athene cunicularia*)
Cactus wren (*Campylorhynchus brunneicapillus*)
California quail (*Callipepla gambelii*)
Cliff swallow (*Petrochelidon pyrrhonota*)
Common Raven (*Corvus corax*)
Costa's hummingbird (*Calypte costae*)
Horned lark (*Eremophila alpestris*)
House finch (*Carpodacus mexicanus*)
Ladder-backed woodpecker (*Picoides scalaris*)
Lark sparrow (*Chondestes grammacus*)
Lesser nighthawk (*Chordeiles acutipennis*)
Lesser yellowlegs (*Tringa flavipes*)-flying over site.
Loggerhead shrike (*Lanus ludovicianus*)
Mourning dove (*Zenaida macroura*)
Northern mockingbird (*Mimus polyglottos*)
Prairie falcon (*Falco mexicanus*)
Rock wren (*Salpinctes obsoletus*)
Sage sparrow (*Amphispiza belli*)
Scott's oriole (*Icterus parisorum*)
Verdin (*Auriparus flaviceps*)
Western tanager (*Piranga ludoviciana*)
White-throated swift (*Aeronautes saxatalis*)
Reptiles
Desert iguana (*Diposaurus dorsalis*)
Desert spiny lizard (*Sceloporus magister*)
Desert tortoise (*Gopherus agassizii*)
Great basin collared lizard (*Crotophytus bicintores*)
Gopher snake (*Pituophis catenifer*)
Mojave rattlesnake (*Crotalus scutulatus*)
Side-blotched lizard (*Uta stansburiana*)
Western whiptail (*Cnemidophorus tigris*)
Zebra-tailed lizard (*Callisaurus draconoides*)

Table 3: Vascular Plants Detected During the SCWRA Surveys

FAMILY Species	Common Name	Habit
APIACEAE		
Lomatium mohavense	Desert parsley	annual
ASCLEPIADACEAE		
Asclepias vestita	Woolly milkweed	perennial
ASTERACEAE		
Acamptopappus sphaerocephalus	Golden heads	perennial shrub
Ambrosia acanthicarpa	Annual bursage	annual
Ambrosia dumosa	White bur-sage	perennial shrub
Ambrosia salsola	Cheesebush	perennial shrub
Anisocoma acaulis	Scale bud	annual
Artemesia tridentata	Great-basin sagebrush	perennial shrub
Camissonia campestris	Sun cups	annual
Chaenactis fremontii	Fremont pincushion	annual
Chrysothamnus nauseosus	Rubber rabbitbush	perennial shrub
Encelia farinosa	Brittlebush	shrub
Eriastrum sapphrinium.	Unknown eriastrum	perennial
Ericameria cooperii	Golden bush	perennial shrub
Eriophyllum pringlei	Pringle's woolly daisy	annual
Eriophyllum wallacei	Wallace's eriophyllum	annual
Erocameria linearifolia	Interior goldenbush	perennial shrub
Gutierrezia sarothrae	Snakeweed	subshrub
Lasthenia californica	Goldfields	annual
Layia glanulosa	White tidy-tips	annual
Lepidospartum squamatum	Scale broom	perennial
Lessingia lemmonii	Vinegar weed	annual
Malacothrix glabrata	Desert dandelion	annual
Stephanomeria pauciflora	Wire lettuce	annual
Tetradymia axillaris	Cotton thorn	perennial shrub
Xylorhiza tortfolia	Mojave aster	perennial shrub
BORAGINACEAE		
Amsinckia tessellata	Fiddleneck	annual
Cryptantha pterocarya.	Forget-me-not	annual
Pectocarya penicillata		annual
Plagiobothrys sp.	Popcorn flower	annual
BRASSICACEAE		
Arabis pulchra	Prince's rock-cress	perennial
Brassica toumeforti	African mustard	annual
Descurania pinnata	Tansy mustard	annual

Lepidium fremontii	Bush peppergrass	shrub
*Sisymbrium altissimum**	Tumble mustard	annual
*Sisymbrium orientale**	Eastern rocket	annual
Stanleya pinnata	Prince's plume	annual
CACTACEAE		
Opuntia basilaris	Beavertail cactus	perennial
Opuntia echinocarpa	Silver cholla	perennial
CHENOPODIACEAE		
Atriplex canescens	Four wing saltbush	perennial shrub
Grayia spinosa	Spiny hopsage	perennial shrub
Krasheninnikovia lanata	Winterfat	perennial shrub
*Salsola tragus**	Russian thistle	annual
CUCURBITACEAE		
Marah fabaceus	California man-root	perennial
CUPRESSACEAE		
Juniperus californica	California juniper	shrub or tree
EPHEDRACEAE		
Ephedra nevadensis	Mormon tea	perennial shrub
EUPHORBIACAE		
Chamaesyce albomarginata	Rattlesnake weed	annual
FABACEAE		
Astragalus lentiginosus	Milvetch	annual
GERANIACEAE		
*Erodium cicutarium**	Red-stemmed filaree	annual
HYDROPHYLLACEAE		
Nama demissum	Purple mat	annual
Nemophila menziesii	Baby blue-eyes	annual
Phacelia crenulata		annual
Phacelia distans	Distant phacelia	annual
Phacelia fremontii		annual
Pholistoma membranaceum		annual
LAMIACEAE		
Marrubium vulgare	Horehound	perennial
Salazaria mexicana	Bladder sage	
Salvia carduacea	Thistle sage	annual
Salvia columbariae	Chia	
Salvia dorrii	Purple sage	perennial
Salazaria mexicana	Bladder sage	perennial
LILIACEAE		
Calochortus kennedyi	Mariposa lily	annual
Dichelostemma capitatum	Desert hyacinth	annual
Yucca brevifolia	Joshua Tree	Tree
LOASACEAE		

Mentzelia obscura	mentzelia	annual
MALVACEAE		
Eremalche exilis		annual
NYCTAGINACEAE		
Mirabilis bigelovii	Wishbone bush	perennial
ONAGRACEAE		
Camissonia campestris	Mojave sun cups	annual
Camissonia claviformis	Brown-eyed primrose	annual
Oenothera sp.	Evening primrose	perennial
PAPERVACEAE		
Escholtzia minutifolia	Small-flowered poppy	annual
POACEAE		
Achnatherum hymenoides	Indian ricegrass	perennial
Achnatherum speciosum	Desert needlegrass	perennial
Bromus madritensis ssp. *rubens**	Red brome	annual
*Bromus tectorum**	Cheat grass	annual
*Schismus arabicus**	Arabian grass	annual
POLEMONIACEAE		
Eriastrum saphirinium.		annual
Gilia latiflora	Broad-flowered gilia	annual
Linanthus dichotomus	Evening snow	annual
Loeseliastrum mathewsii	Desert calico	annual
POLYGONACEAE		
Eriogonum fasciculatum	California buckwheat	perennial
Eriogonum sp.	Unknown buckwheat	annual
Oxytheca perfoliata		annual
Rumex hymenosepalus	Wild-rhubarb	perennial
PORTULACACEAE		
Calandrinia ciliata	Red maids	annual
ROSACEAE		
Purshia tridentata	Antelope bush	shrub
SCROPHULARIACEAE		
Castilleja angustifolia	Desert paintbrush	annual
SOLANAECEAE		
Datura wrightii	Datura	Annual or perennial
Lycium andersonii	Anderson's boxthorn	perennial shrub
Lycium cooperi	Cooper's boxthorn	perennial shrub
ZYGOPHYLLACEAE		
Larrea tridentata	Creosote	shrub

Appendix D-18

Desert Tortoise Survey 2011

Appendix D-13

Desert Tortoise Survey 2013

DRAFT FOCUSED DESERT TORTOISE SURVEY

FOR THE

ALTA EAST WIND ENERGY PROJECT

KERN COUNTY, CALIFORNIA

June 2011

Prepared for:
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Executive Summary

Alta Windpower Development, LLC proposes to construct and operate the Alta East Wind Energy Project (Project) in Kern County, California, a nominal 360 megawatt (MW) wind energy facility which is a component of the Alta Wind Energy Center. The Project is located at the eastern base of the Tehachapi Mountains, 2 miles west of the intersection of Highway 58 and Highway 14 in the northwest portion of the Mojave Desert and is within the Tehachapi Wind Resource Area of eastern Kern County (Appendix A, Figure 1). The Project comprises approximately 3,200 acres, 2,083 of which are on federal land under the jurisdiction of the Bureau of Land Management (BLM) and 1,117 acres of which are on private land under the jurisdiction of Kern County.

The desert tortoise (*Gopherus agassizii*) is listed as a threatened species under the federal Endangered Species Act and the California Endangered Species Act. A U.S. Fish and Wildlife Service protocol-level spring survey was conducted by Garcia and Associates (GANDA), a subcontractor to CH2M HILL, between April 20 and May 2, 2011 to determine presence or absence of this species in areas of suitable desert tortoise habitat within the Project survey area, based on the desert tortoise protocol *Preparing for any Action That May Occur within Range of the Mojave Desert Tortoise* (USFWS 2010). Previous surveys for desert tortoise were completed for the Project in 2009 and 2010 (Sundance Biology 2009, Phoenix Ecological 2010). The 2011 surveys were completed to augment previously completed surveys within the Project area. Approximately 413 acres were surveyed for desert tortoise during this survey effort.

No live desert tortoises were observed in the Project survey area; however, one Class 5 desert tortoise carcass (disarticulated and scattered) (USFWS 1992) was observed in the Project survey area (Appendix A, Figure 3). In addition, two Class 4 burrows (good condition, possibly tortoise) (DTC 1994) were observed in the Project survey area (Appendix A, Figure 3). Because no tortoise sign was associated with the burrows, they are considered inactive. The California Natural Diversity Data Base (CNDDB) includes two desert tortoise records within 5 miles of the Project survey area, the nearest of which dates from 1992 and is approximately 1.5 miles north of the Project survey area (CDFG 2011). One desert tortoise was documented approximately 5.5 miles southwest of the Project survey area in 2010 during preconstruction clearance surveys conducted for the Alta-Oak Creek Mojave Project (CH2M HILL 2010). The same individual tortoise was observed in 2011 at the same location. There is no designated critical habitat for the desert tortoise habitat in the Project survey area.

1 Project and Property Description

1.1 Project Description

Alta Windpower Development, LLC proposes to construct and operate the Alta East Wind Energy Project (Project) in Kern County, California (Appendix A, Figure 1), a nominal 360 megawatt (MW) wind energy facility which is a component of the Alta Wind Energy Center Project. Major components of the proposed Project include up to 120 wind turbine generators, a substation, transmission interconnection, access roads, and ancillary services. The proposed Project site is described below.

1.2 Property Description

The Project is located at the eastern base of the Tehachapi Mountains, 2 miles west of the intersection of Highway 58 and Highway 14 in the northwest portion of the Mojave Desert and is within the Tehachapi Wind Resource Area of eastern Kern County (Appendix A, Figure 1). The Project comprises approximately 3,200 acres, 2,083 of which are on federal land under the jurisdiction of the BLM and 1,117 acres of which are on private land under the jurisdiction of Kern County.

Sections of the Project contain suitable habitat for desert tortoise. Those areas of suitable habitat that had not been previously surveyed in 2009 and 2010 (Sundance Biology 2009, Phoenix Ecological 2010), comprising 413 acres, are herein referred to as the Project survey area (Appendix A, Figure 1). The Project survey area is covered with natural vegetation, mainly juniper woodland and Joshua tree woodland communities (Holland 1986). Elevations within the Project survey area range from approximately 2,900 to 4,000 feet. Representative photographs of the Project site are included in Appendix B.

Suitable desert tortoise habitat in the Project survey area consists of the following: Joshua tree woodland and juniper woodland habitats; elevations between 300-5,000 feet; friable soils for digging burrows; topographic features such as desert flats, alluvial fans, rolling hills, and low mountains; and an average annual precipitation of 2-8 inches (USFWS 2010).

2 Methods

2.1 Information Review

Pre-field research was conducted to determine whether desert tortoise and designated critical habitat for desert tortoise are known to occur within or near the Project survey area. A query of the CNDDB was conducted for any records of this species within a 5-mile radius of the Project survey area. The search area for this query included the one U.S. Geological Survey 7.5' quadrangle that includes the Project survey area (Mojave), and eight adjacent quadrangles (Monolith, Tehachapi NE, Cache Peak, Mojave NE, Sanborn, Bissell, Willow Springs, and Soledad Mountain). The Desert Tortoise (Mojave Population) Recovery Plan was used to locate the nearest designated critical habitat unit for desert tortoise (USFWS 1994).

The CNDDB query revealed two known desert tortoise occurrences within 5 miles of the Project survey area (Appendix A, Figure 2). The nearest CNDDB desert tortoise record occurs approximately 1.5 miles north of the Project survey area and was recorded in 1992 (CDFG 2011). An unreported individual desert tortoise was observed approximately 5.5 miles southwest of the Project survey area in 2010 (GANDA 2010). The same individual tortoise was observed again at the same location in April 2011 (GANDA 2011). No designated critical habitat unit for desert tortoise occurs within 5 miles of the survey area (CDFG 2011). The location of the nearest designated desert tortoise critical habitat, the Fremont-Kramer Critical Habitat Unit of the Western Mojave Recovery Unit, is approximately 19 miles east of the Project survey area (USFWS 1994).

2.2 Field Survey

The Project survey areas included areas for proposed wind energy facility development within suitable habitat for desert tortoise (Appendix A, Figure 3). Field surveys conducted for this Project followed the U.S. Fish and Wildlife Service's (USFWS's) desert tortoise protocol *Preparing for any Action That May Occur within Range of the Mojave Desert Tortoise* (USFWS 2010). The entire Project survey area (Appendix A, Figure 1) was surveyed using transect centerlines spaced a maximum of 10 meters apart. A Trimble® GEOXT GPS unit, GPSMAP® 60CSx GPS unit, and a compass were used to maintain proper orientation and spacing. The lead surveyor navigated by using the navigation feature on the map screen of the Trimble® unit. This feature plotted the survey transect lines as surveyors walked and allowed the lead surveyor to determine which areas had already been surveyed and to maintain the appropriate spacing between transect centerlines. At the end of each transect, the starting point was shifted using the UTM coordinates readout. Using this method, the survey area was systematically walked until 100 percent of the survey area was visually inspected.

Surveys were conducted within the required protocol activity period (April through May) of desert tortoise (USFWS 2010) and conducted on foot between April 20 and May 2, 2011 between 0810 and 1730 hours. During the surveys, skies were clear with temperatures between 50-80°F. Winds were calm to moderate. No precipitation occurred during the field surveys. Air temperatures during the field survey remained below the maximum protocol limit of 104°F.

Two small areas in the Project survey area were not surveyed due to unsuitable desert tortoise habitat (Appendix A, Figure 3). The total area excluded was 34 acres. This 34-acre area contained slopes greater than 40 degrees, which were also unsafe for surveyor safety concerns and unlikely to support desert tortoise. The western unit of the Mojave population of desert tortoise occurs primarily in valleys, on alluvial fans, bajadas, and rolling hills in saltbush and creosote bush scrub habitat (USFWS 1994). The Mojave population of desert tortoise is least common in desert areas with steep slopes, utilizing slopes from 0 to 33 degrees (BLM 2011, Gardner and Brodie 1998).

Zone-of-influence transects (one single transect at 200 meters, 400 meters, and 600 meters from the Project survey area perimeter) are required by USFWS protocol when neither tortoise nor tortoise sign is encountered during the project site survey (USFWS 2010). However, zone-of-influence surveys were not conducted because tortoise sign (one Class 5 [disarticulated and scattered] desert tortoise carcass and two Class 4 [good condition, possibly desert tortoise] burrows) was encountered during surveys in the Project survey area (Appendix A, Figure 3).

During the field survey, particular emphasis was placed on searching around the bases of shrubs. All burrows that had the likelihood of tortoise occupancy were examined thoroughly, regardless of whether they appeared to have been constructed by desert tortoise. Burrows were inspected by using a mirror to reflect sunlight into the far end, if visible, to determine occupancy. Burrows observed during the survey that fit the specifications of desert tortoise burrows (i.e., having a half-moon shaped opening and a gradual downslope entrance of less than 30°) were noted as "potential desert tortoise burrow" and given a burrow classification (DTC 1994). Only burrows with large enough entrances to accommodate adult or subadult desert tortoises were recorded. It was noted when the end of a "potential desert tortoise burrow" could not be observed by the human eye. No burrows were found to be collapsed or altered by surveyors during field surveys.

The field supervisor for the surveys was GANDA biologist Molly Graber. GANDA USFWS Authorized Biologists for desert tortoise surveys were Margaret Adam, Jacqueline Finck, and Steve Paris. The field supervisor and Authorized Biologists were also experienced leading and/or conducting burrowing owl surveys. The other field surveyors were Laura Megill, Ryan Hilgris, Debbie Beckett, Saana Deichsel, and Angela Gallardo. All surveyors were trained in the use of the USFWS 2010 desert tortoise survey protocol and were experienced in surveying for the species. Field survey datasheets were completed each day and are included in Appendix C of this report.

3 Results

This section describes the results of the USFWS protocol-level survey for desert tortoise, as well as incidental sensitive species observed during desert tortoise surveys.

3.1 Desert Tortoise Protocol-Level Survey Results

No live desert tortoise were observed in the Project survey area; however, one Class 5 desert tortoise carcass (disarticulated and scattered) (USFWS 1992) was observed in the Project survey area (Appendix A, Figure 3). In addition, two Class 4 desert tortoise burrows (good condition, possibly tortoise) (DTC 1994) were observed in the Project survey area (Appendix A, Figure 3). No sign was associated with the burrows, and they are therefore considered inactive.

A summary table of all desert tortoise finds is provided below in Table 1. Results are also documented on copies of the field data sheets provided in Appendix C. USFWS considers the results of this desert tortoise survey to be valid for no more than one year.

Table 1. Alta East Desert Tortoise Survey Results. April/May 2011.

Find	Figure 3 ID Appendix A	Date	Sex	MCL (mm)	Class[1]	Dimensions W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
DETO burrow	DTB1	4.27.11	-	-	4	10-9->32	No	W-SW	#1530-1531_MG	Apron present, too round
DETO burrow	DTB2	4.28.11	-	-	4	8-6->24	No	SE	#1535_MG	Apron present. Outside of survey area
DETO carcass	DTC1	4.26.11	U	-	5	-	-	-	#1527-1529_MG	Plastron scattered, but in large sections

Class[1]
DETO BURROW- CLASS 4= good condition, possibly desert tortoise (DTC 1994)
DETO CARCASS- CLASS 5= disarticulated and scattered (USFWS 1992)

3.2 Incidental Species Results

Two potential burrowing owl (*Athene cunicularia*) burrows with sign were observed during desert tortoise surveys (Appendix A, Figure 3). Both burrows had owl whitewash present. The burrowing owl is a California Species of Special Concern, as well as a migratory bird species protected by international treaty under the Migratory Bird Treaty Act (MBTA) of 1918. A summary table of incidentally observed sensitive species is provided below in Table 2. Results are also documented on copies of the field data sheets provided in Appendix C.

Table 2. Alta East Incidental Species Results. April/May 2011.

Find	Figure 3 ID Appendix A	Date	Dimensions W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
Potential Burrowing Owl Burrow with Sign	BUOW1	4.21.11	-	No	E	#16_LM	whitewash
Potential Burrowing Owl Burrow with Sign	BUOW2	4.27.11	-	Yes	S	#1532_MG	whitewash

References and Personal Communications

Bureau of Land Management

2011 Desert Tortoise (Gopherus *agassizii*). http://www.blm.gov/ca/forms/wildlife/details.php?metode=serial_number&search=2568 Accessed June 3.

California Department of Fish and Game (CDFG)

2011 Rarefind, a California Natural Diversity Database (CNDDB). A database of special status biological resources maintained by the Natural Heritage Division. Sacramento, California. Version 3.1.1. Accessed May 2011.

CH2M HILL Engineers, Inc. (CH2M HILL)

2010 Special-Status Species Report for the Alta-Oak Creek Mojave Project-Phase 2 Subarea, Kern County, California. Memo. Submitted to Alta Wind Power, LLC. May 3.

Desert Tortoise Council (DTC)

1994 Guidelines for Handling Desert Tortoises During Construction Projects. Edward L. LaRue, Jr., editor. Wrightwood, California. Revised 1999.

Garcia and Associates (GANDA)

2010 Personal Communication. Prior knowledge of desert tortoise occurrence due to biological consulting experience on Alta Wind Energy Projects.

2011 Personal Communication. Prior knowledge of desert tortoise occurrence due to biological consulting experience on Alta Wind Energy Projects.

Gardner, T.J. and E.D. Brodie Jr.

1998 The Use of Steep Slopes by Desert Tortoises (*Gopherus agassizii*) in the Western Mojave: Notes on Ecology and a Discussion of G_0. Department of Biology, Utah State University, Logan, UT.

Holland, R. F.

1986 Preliminary descriptions of the terrestrial natural communities of California. California Department of Fish and Game. Unpublished report.

Phoenix Ecological Consulting

2010 Desert Tortoise (*Gopherus agassizii*) & Burrowing Owl (*Athene cunicularia*) Protocol Presence/Absence Surveys for Sun Creek Wind Resource Area, Kern County, California. Prepared for CH2M HILL. July 14.

Sundance Biology, Inc.

2009 Presence/Absence Survey for the Desert Tortoise *(Gopherus agassizii)* on the proposed Sun Creek Project, Kern County, California. Prepared for CH2M HILL. August 25.

United States Fish and Wildlife Service (USFWS)

1992 Field Survey Protocol for any Federal Action that may occur within Range of the Desert Tortoise. January.

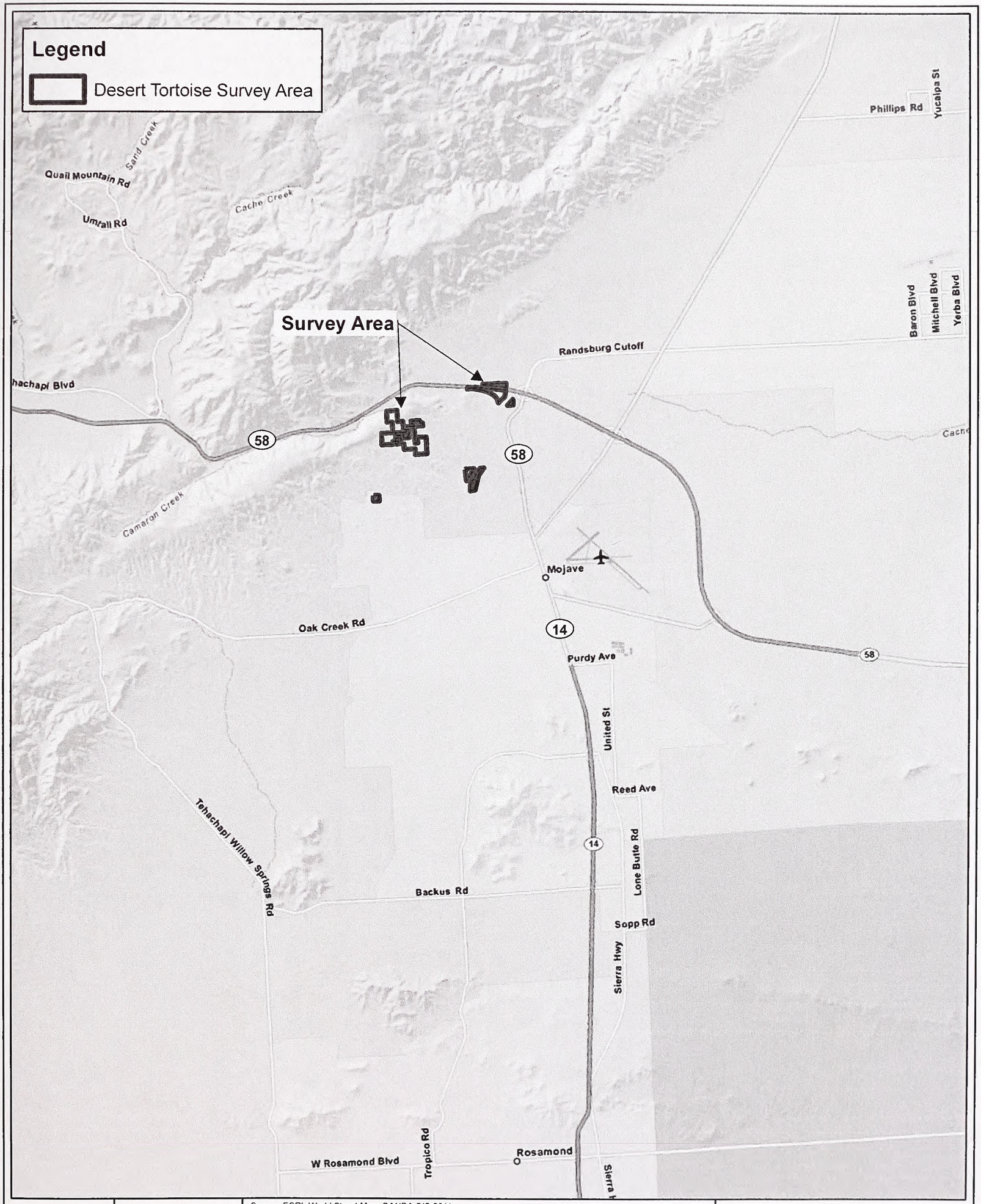
1994 Desert tortoise (Mojave population) Recovery Plan. U.S. Fish and Wildlife Service, Portland, Oregon.

2010 Preparing for any Action that May Occur within the Range of the Mojave Desert Tortoise (*Gopherus agassizii*). 2010 Field Season.

APPENDIX A

Alta East Wind Energy Project

Figures



GANDA

Project Location:

Source: ESRI, World Street Map, GANDA GIS 2011

Kilometers
0 4

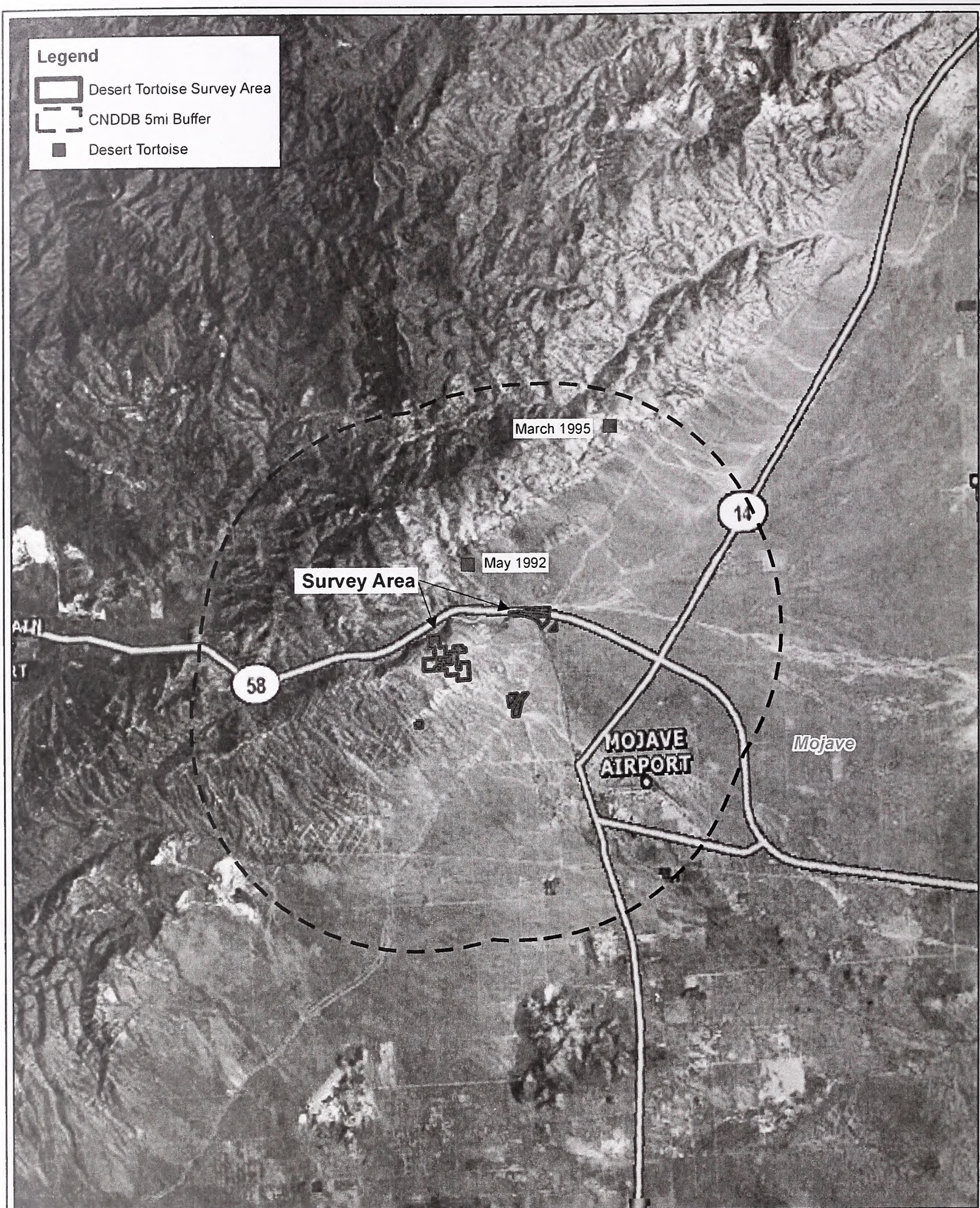
Miles
0 4

Figure 1. Project Location

Alta East Wind Energy Project

Kern County, CA

June 2011



GANDA

Project Location:

Source: ESRI, World Street Map; GANDA GIS 2011

Kilometers
0 4

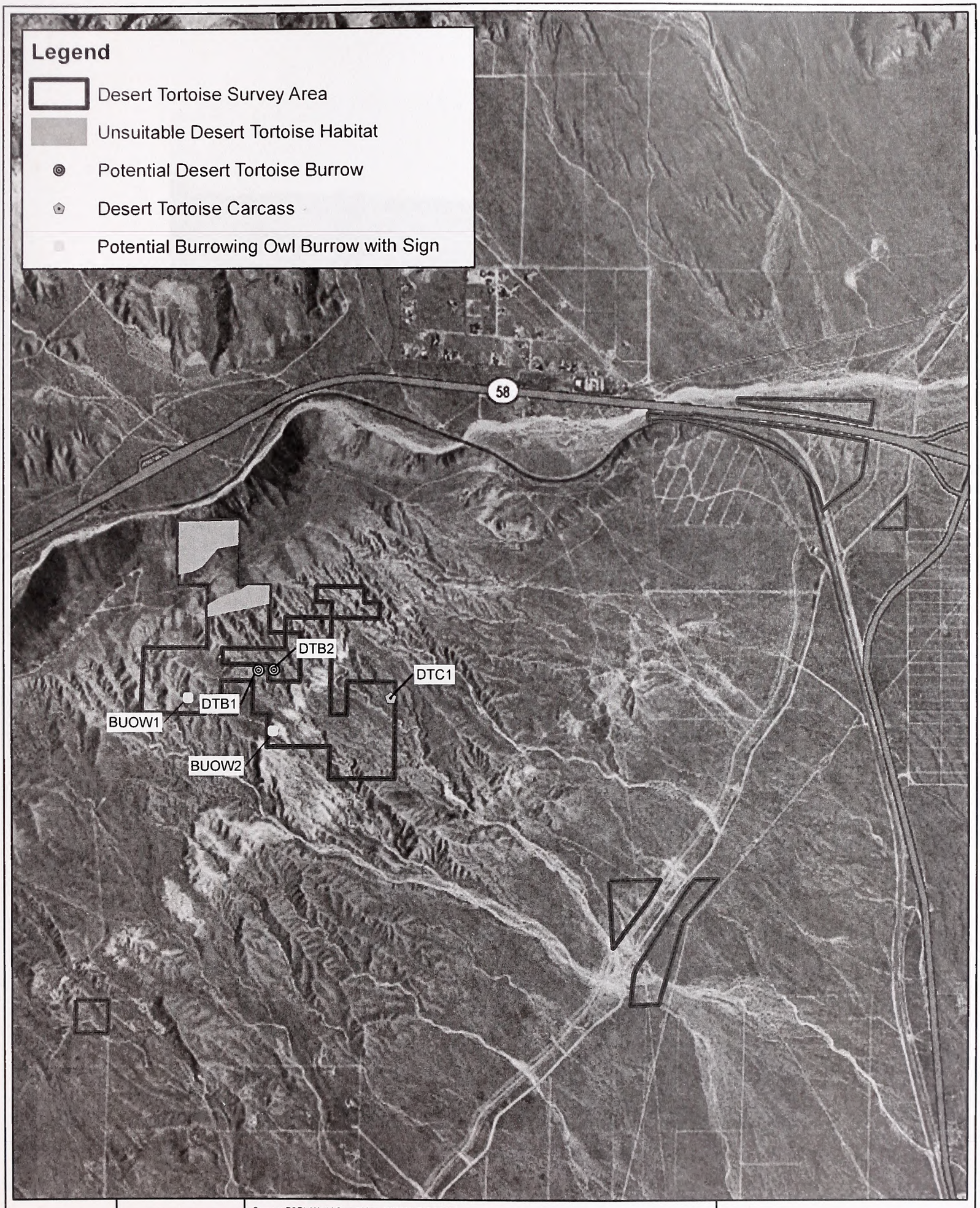
Miles
0 4

Figure 2. 5-mile CNDDB Desert Tortoise Occurrences

Alta East Wind Energy Project

Kern County, CA

June 2011



GANDA

Project Location:

Source: ESRI, World Street Map, GANDA GIS 2011

0 1 Kilometers

0 1 Miles

Figure 3. Project Survey Area and Results

Alta East Wind Energy Project

Kern County, CA

June 2011

APPENDIX B

Alta East Wind Energy Project

Representative Photos



Photo 1. Joshua Tree Woodland Habitat. Alta East 2011.



Photo 2. Juniper Woodland Habitat. Alta East 2011.



Photo 3. Area not surveyed due to unsuitable habitat for desert tortoise. Alta East 2011.



Photo 4. Class 5- Desert Tortoise Carcass (DTC1). April 26, 2011. Alta East.



Photo 5. Class 4- Potential Desert Tortoise Burrow (DTB1). April 27, 2011. Alta East.



Photo 6. Class 4- Potential Desert Tortoise Burrow (DTB2). April 28, 2011. Alta East.



Photo 7. Potential Burrowing Owl Burrow with Sign (BUOW1). April 21, 2011. Alta East.



Photo 8. Potential Burrowing Owl Burrow with Sign (BUOW2). April 27, 2011. Alta East.

APPENDIX C

Alta East Wind Energy Project

Field Data Sheets

Sensitive Wildlife Survey Form

Date: 4/21/11

Biological Surveyor(s): M.Graber, L.Megill, M.Adam, S.Diechsel, R.Hilgris

Start Time: 0700

Site/Engineering Feature: Alta East

End Time: 1530

GPS Name+File Name: Suncreek_MG_042111

Habitat Community: Juniper woodland

Temperature Range: 52-59 °F Wind Speed Range 17-36, gusts 45

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Cloud Cover Range 5-18 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
1294	Pot. BUOW with sign	-	-	-	single entrance	No	East	16_LM	Whitewash
Incidental Species: black-tailed jackrabbit, house sparrow, grasshopper sparrow									

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (Potential BUOW with/without sign, BUOW Occupied Burrow, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS (DTC 1994)
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS (USFWS 1992)
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
3=dry w/o glaze or odor; light brown, tightly packed
4=dry w/o glaze, yellow, loose material, scaly appearance
5=dry w/o glaze or odor, bleached (white)

LIVE DETO-CLASS
Condition: 1=healthy
2=evidence of URDS
3=shell cracked
4=peeling scutes
5=ticks
6=other

DETO CARCASS- CLASS (USFWS 1992)
1= fresh
2= normal color, scutes adhering to bone
3= scutes have peeled off bone
4= bones falling apart, growth rings on scutes are peeling
5= disarticulated and scattered

DETO SIGN OTHER- CLASS
1= egg shell
2= drinking site
3=courtship ring
4=evidence of fight
5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 4/26/11

Biological Surveyor(s): M.Graber, R.Hilgris, S.Scott, D.Beckett, S.Paris

Start Time: 0900

Site/Engineering Feature: Alta East

End Time: _____

GPS Name+File Name: Suncreek_MG_042611

Habitat Community: Juniper woodland

Temperature Range: 60 °F Wind Speed Range 10mph

Page 1 / 1

Cloud Cover Range 0-5 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
NA	DETO carcass	U	-	5	-	-	-	1527-1529_MG	Plastron, scattered, but in large sections

Incidental Species:

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (Potential BUOW with/without sign, BUOW Occupied Burrow, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
3=dry w/o glaze or odor; light brown, tightly packed
4=dry w/o glaze, yellow, loose material, scaly appearance
5=dry w/o glaze or odor, bleached (white)

LIVE DETO-CLASS
Condition: 1=healthy
2=evidence of URDS
3=shell cracked
4=peeling scutes
5=ticks
6=other

DETO CARCASS- CLASS
1= fresh
2= normal color, scutes adhering to bone
3= scutes have peeled off bone
4= bones falling apart, growth rings on scutes are peeling
5= disarticulated and scattered

DETO SIGN OTHER- CLASS
1= egg shell
2= drinking site
3=courtship ring
4=evidence of fight
5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 4/27/11

Biological Surveyor(s): M.Graber, R.Hilgris, S.Scott, S.Paris

Start Time: 0815

Site/Engineering Feature: Alta East

End Time: 1630

GPS Name+File Name: Suncreek_MG_042711

Habitat Community: Juniper woodland

Temperature Range: 60-75 °F Wind Speed Range 0-5

Page 1 / 1

Cloud Cover Range 0 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
NA	DETO burrow	-	-	4	10-9->32	No	W-SW	1530_MG	Apron present, too round
NA	Pot. BUOW with sign	-	-	-	-	Yes	South	1532_MG	Whitewash

Incidental Species:

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (Potential BUOW with/without sign, BUOW Occupied Burrow, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
3=dry w/o glaze or odor; light brown, tightly packed
4=dry w/o glaze, yellow, loose material, scaly appearance
5=dry w/o glaze or odor, bleached (white)

LIVE DETO-CLASS
Condition: 1=healthy
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3=shell cracked
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DETO CARCASS- CLASS
1= fresh
2= normal color, scutes adhering to bone
3= scutes have peeled off bone
4= bones falling apart, growth rings on scutes are peeling
5= disarticulated and scattered

DETO SIGN OTHER- CLASS
1= egg shell
2= drinking site
3=courtship ring
4=evidence of fight
5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 4/28/11

Biological Surveyor(s): M.Graber, R.Hilgris, S.Scott, S.Paris, D.Beckett

Start Time: 0900

Site/Engineering Feature: Alta East

End Time: 1730

GPS Name+File Name: Suncreek_MG_042811

Habitat Community: TBD

Temperature Range: 55-65 °F Wind Speed Range 30-45

Page 1 / 1

Cloud Cover Range 0-5 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
NA	DETO burrow	-	-	4	8-6->24	No	SE	1535_MG	Apron present. Outside of survey area

Incidental Species:

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (Potential BUOW with/without sign, BUOW Occupied Burrow, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)
Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
3=dry w/o glaze or odor; light brown, tightly packed
4=dry w/o glaze, yellow, loose material, scaly appearance
5=dry w/o glaze or odor, bleached (white)

LIVE DETO-CLASS
Condition: 1=healthy
2=evidence of URD
3=shell cracked
4=peeling scutes
5=ticks
6=other

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2= normal color, scutes adhering to bone
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4= bones falling apart, growth rings on scutes are peeling
5= disarticulated and scattered

DETO SIGN OTHER- CLASS
1= egg shell
2= drinking site
3=courtship ring
4=evidence of fight
5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 4/29/11

Biological Surveyor(s): M.Graber, S.Scott, S.Paris, D.Beckett

Start Time: 0900

Site/Engineering Feature: Alta East

End Time: 1630

GPS Name+File Name: Suncreek_MG_042911

Habitat Community: Juniper woodland

Temperature Range: 50-65 °F Wind Speed Range 35-40

Page 1 / 1

Cloud Cover Range 0-5 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
	No Data Recorded								
Incidental Species:									

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (Potential BUOW with/without sign, BUOW Occupied Burrow, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)
Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
3=dry w/o glaze or odor; light brown, tightly packed
4=dry w/o glaze, yellow, loose material, scaly appearance
5=dry w/o glaze or odor, bleached (white)

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Condition: 1=healthy
2=evidence of URDS
3=shell cracked
4=peeling scutes
5=ticks
6=other

DETO CARCASS- CLASS
1= fresh
2= normal color, scutes adhering to bone
3= scutes have peeled off bone
4= bones falling apart, growth rings on scutes are peeling
5= disarticulated and scattered

DETO SIGN OTHER- CLASS
1= egg shell
2= drinking site
3=courtship ring
4=evidence of fight
5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Appendix D-19

Burrowing Owl Survey Report 2011

FOCUSED BURROWING OWL PHASE I AND II SURVEYS

FOR THE

ALTA EAST WIND ENERGY PROJECT

KERN COUNTY, CALIFORNIA

June 2011

Prepared for:
CH2M Hill Engineers, Inc.
155 Grand Avenue
Oakland, CA 94612

Report Preparer:
Jacqueline Finck, Wildlife Biologist
Garcia and Associates
435 Lincoln Way
Auburn, California 95603

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Appendix A. Alta East Wind Project: Figures
Appendix B. Alta East Wind Project: Representative Photos
Appendix C. Alta East Wind Project: Field Data Sheets
Appendix D. Alta East Wind Project: Wildlife Observation List

Executive Summary

Alta Windpower Development, LLC proposes to construct and operate the Alta East Wind Energy Project (Project) in Kern County, California, a nominal 360 megawatt (MW) wind energy facility which is a component of the Alta Wind Energy Center. The Project is located at the eastern base of the Tehachapi Mountains, 2 miles west of the intersection of Highway 58 and Highway 14 in the northwest portion of the Mojave Desert and is within the Tehachapi Wind Resource Area of eastern Kern County (Appendix A, Figure 1). The Project comprises approximately 3,200 acres, 2,083 acres of which are on federal land under the jurisdiction of the Bureau of Land Management (BLM) and 1,117 acres of which are on private land under the jurisdiction of Kern County.

The burrowing owl (*Athene cunicularia*) is a California Species of Special Concern, as well as a migratory bird species protected by international treaty under the Migratory Bird Treaty Act (MBTA) of 1918. Protocol-level Phase I and II surveys were conducted concurrently by Garcia and Associates (GANDA), a subcontractor to CH2M HILL, between April 20 and May 2, 2011 to determine presence or absence of individual owls or potential owl burrows in the Project survey area, based on the burrowing owl protocol *California Burrowing Owl Consortium* (CBOC) *Survey Protocol & Mitigation Guidelines* (CBOC 1993). Previous surveys for burrowing owl were completed for the Alta East Wind Energy Project (Phoenix Ecological 2010a, 2010b); therefore, the 2011 surveys were completed to augment previously completed surveys within the Project. Approximately 1,321 acres were surveyed for burrowing owl during this survey effort.

No burrowing owls were observed in the Project survey area during surveys; however, one potential burrowing owl burrow with sign (owl whitewash) was observed in the Project survey area (Appendix A, Figure 3). In addition, three potential burrowing owl burrows without sign—burrows which could potentially be utilized by burrowing owls based on size—were observed in the Project survey area. Phase III surveys to confirm occupancy of these four burrows will be conducted in June or July 2011. The California Natural Diversity Data Base (CNDDB) includes five burrowing owl records within 5 miles of the Project survey area; the nearest two records are overlap with the southwest section of the Project survey area, which date from May 1921 and June 2005 (CDFG 2011).

1 Project and Property Description

1.1 Project Description

Alta Windpower Development, LLC proposes to construct and operate the Alta East Wind Energy Project (the Project) in Kern County, California (Appendix A, Figure 1), a nominal 360 megawatt (MW) wind energy facility which is a component of the Alta Wind Energy Center Project. Major components of the proposed Project include up to 120 wind turbine generators, a substation, transmission interconnection, access roads, and ancillary services. The proposed Project site is described below.

1.2 Property Description

The Project is located at the eastern base of the Tehachapi Mountains, 2 miles west of the intersection of Highway 58 and Highway 14 in the northwest portion of the Mojave Desert and is within the Tehachapi Wind Resource Area of eastern Kern County (Appendix A, Figure 1). The Project comprises approximately 3,200 acres; 2,083 acres of which are on federal land under the jurisdiction of the BLM, and 1,117 acres of which are on private land under the jurisdiction of Kern County.

Areas of the Project contain suitable habitat for burrowing owl. Those areas of potentially suitable habitat that had not been previously surveyed in 2010 (Phoenix Ecological 2010a, 2010b), comprising 1,321 acres, are herein referred to as the Project survey area (Appendix A, Figure 1). The Project survey area is covered with natural vegetation, mainly Mojave creosote bush scrub and Joshua tree woodland communities (Holland 1986). Elevations within the Project survey area range from approximately 3,000 to 3,400 feet. Representative photographs of the Project site are included in Appendix B.

2 Methods

2.1 Information Review

Pre-field research was conducted to determine whether burrowing owl is known to occur within or near the Project survey area. A search of the CNDDB was conducted for any records of this species within a 5-mile radius of the Project survey area. The search area for this background research included the two U.S. Geological Survey 7.5' quadrangles that include the Project survey area (Mojave and Monolith), and 10 adjacent quadrangles (Tehachapi North, Tehachapi NE, Tehachapi South, Cache Peak, Mojave NE, Sanborn, Tylerhorse Canyon, Willow Springs, Bissell, and Soledad Mountain).

The CNDDB search revealed five known burrowing owl occurrences within 5 miles of the Project survey area (Appendix A, Figure 2). The nearest two CNDDB burrowing owl records occur within the southern portion of the Project survey area, which were recorded in May 1921 and June 2005 (CDFG 2011).

2.2 Field Survey

Phase I and II surveys for burrowing owl were conducted concurrently on foot between April 20 and May 2, 2011 using guidance from the California Burrowing Owl Consortium (CBOC) *Survey Protocol & Mitigation Guidelines* (CBOC 1993). The purpose of a Phase I survey is to conduct an assessment of habitat suitability for burrowing owls. The purpose of a Phase II survey is to conduct a search for individual burrowing owls, as well as appropriately-sized burrows a burrowing owl could potentially use, if it has been determined during Phase I surveys that suitable burrowing owl habitat is present.

The Project survey area included the proposed transmission line which would interconnect to the wind energy facility (Appendix A, Figure 3). Survey methods consisted of walking the entire Project survey area, which included the impact area (200-foot wide transmission corridor) and buffer zone (250 feet on either side of the impact area). Surveyors searched for individual owls, as well as potential burrowing owl burrows that had the potential for burrowing owl use based on size of burrow. Presence of burrowing owl sign (whitewash, pellets, and feathers) was also noted at potential burrowing owl burrows. All potential burrowing owl burrows were inspected by using a mirror to reflect sunlight into the far end, if visible, to determine additional burrowing owl sign. It was noted when the end of a potential burrowing owl burrow could not be observed by the human eye. No burrows were to be collapsed or altered by surveyors during field surveys.

The entire Project survey area (Appendix A, Figure 1) was surveyed by spacing the transect centerlines a maximum of 100 feet apart during the peak time of season (April 15 through July 15) for encountering breeding burrowing owls (February 1 to August 31) (CBOC 1993). A Trimble® GEOXT GPS unit was used to maintain proper orientation and spacing. The lead surveyor navigated by using the navigation feature on the map-screen of the Trimble unit. This feature plotted the survey transect lines as the surveyors walked and allowed the lead surveyor to determine which areas had already been surveyed and to maintain the appropriate spacing

between transect centerlines. Using this method, the survey area was systematically walked until 100 percent of the survey area was visually inspected.

The field supervisor was GANDA biologist Molly Graber. The other field surveyors were Margaret Adam, Jacqueline Finck, Steve Paris, Laura Megill, Ryan Hilgris, Debbie Beckett, Saana Deichsel, and Angela Gallardo. All surveyors were trained in burrowing owl survey protocol and had previous experience surveying for burrowing owl. Field survey datasheets were completed each day and are included in Appendix C of this report.

3 Results

This section describes the results of the protocol-level Phase I and II surveys which were conducted concurrently for burrowing owl, as well as incidental sensitive species observed during burrowing owl surveys. All other wildlife observed during the field surveys are noted in Appendix D.

Surveys were conducted during the day in weather that was conducive to observing owls outside of their burrows; surveys were carried out on days with good visibility and clear skies, little to moderate wind speeds, and no precipitation.

Table 1. Phase I and II Burrowing Owl Survey Dates, Time, Weather, and Personnel.

Date	Time	Weather	Biologist(s)
April 20, 2011	1030-1600	Temperature: 59-64 F Wind: 15-36 mph Cloud Cover: 5-25% Fog: none Precipitation: none	M.Graber L.Megill M.Adam
April 21, 2011	0700-1530	Temperature: 52-59 F Wind: 17-36 with 45 mph gust Cloud Cover: 5-18% Fog: none Precipitation: none	M.Graber L.Megill M.Adam S.Diechsel R.Hilgris
April 22, 2011	0900-1345	Temperature: 58 F Wind: 10 mph Cloud Cover: 0% Fog: none Precipitation: none	M.Graber S.Diechsel R.Hilgris D.Beckett S.Paris
April 26, 2011	0900-xxxx	Temperature: 60 F Wind: 10 mph Cloud Cover: 0-5% Fog: none Precipitation: none	M.Graber S.Scott R.Hilgris D.Beckett S.Paris
April 27, 2011	0815-1630	Temperature: 60-75 F Wind: 0-5 mph Cloud Cover: 0% Fog: none Precipitation: none	M.Graber S.Scott R.Hilgris S.Paris
April 28, 2011	0900-1730	Temperature: 55-65 F Wind: 30-45 mph Cloud Cover: 0-5% Fog: none Precipitation: none	M.Graber S.Scott R.Hilgris D.Beckett S.Paris
April 29, 2011	0900-1630	Temperature: 50-65 F Wind: 35-40 mph Cloud Cover: 0-5% Fog: none Precipitation: none	M.Graber S.Scott D.Beckett S.Paris
April 30, 2011	0830-1630	Temperature: 55-65 F Wind: 5 mph Cloud Cover: 0% Fog: none Precipitation: none	M.Graber S.Scott D.Beckett S.Paris
May 2, 2011	0900-1330	Temperature: 60-80 F Wind: 0-5 mph Cloud Cover: 0-3% Fog: none Precipitation: none	J.Finck L.Megill D.Beckett R.Hilgris S.Scott A.Gallardo

3.1 Phase I Habitat Assessment Results

Suitable burrowing owl habitat was noted throughout the entire 1,321-acre Project survey area (Appendix A, Figure 1). Suitable burrowing owl habitat in the Project survey area consisted of desert habitat, low-growing vegetation with shrub canopy cover less than 30 percent of ground surface, and presence of fossorial mammal burrows and/or availability of man-made structures such as debris piles and culverts (CBOC 1993).

The Project survey area is covered with natural vegetation, mainly Mojave creosote bush scrub and Joshua tree woodland communities (Holland 1986). Topographical features included desert flats and alluvial fans. Elevations within the Project survey area range from approximately 3,000 to 3,400 feet.

3.2 Phase II Burrow Survey Results

No individual owls were observed in the Project survey area during surveys, which were conducted during the species' nesting season (February 1 to August 31). However, one potential burrowing owl burrow with sign (owl whitewash) was observed in the Project survey area (Appendix A, Figure 3). In addition, three potential burrowing owl burrows with no owl sign were observed in the Project survey area (Appendix A, Figure 3).

A summary table of all burrowing owl observations is provided below in Table 2. Results are also documented on copies of the field data sheets provided in Appendix D.

Table 2. Alta East Burrowing Owl Survey Results. April/May 2011.

Find	Figure 3 ID Appendix A	Date	Dimensions W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
Potential Burrowing Owl Burrow with Owl Sign	BUOW1	4.20.11	-	No	E	#12_LM	whitewash
Potential Burrowing Owl Burrow with No Owl Sign	BUOW2	5.2.11	6-4->12	No	W	-	-
Potential Burrowing Owl Burrow with No Owl Sign	BUOW3	5.2.11	7-5->12	No	E	-	-
Potential Burrowing Owl Burrow with No Owl Sign	BUOW4	5.2.11	7-6->12	No	E	-	-

3.3 Incidental Species Results

A summary table of all incidental species observations is provided below in Table 3. Results are also documented on copies of the field data sheets provided in Appendix D.

One Class 4 desert tortoise (*Gopherus agassizii*) burrow (good condition, possibly tortoise) (DTC 1994) was observed in the southern Project survey area (Appendix A, Figure 3). The desert tortoise is listed as a threatened species under the federal Endangered Species Act and the

California Endangered Species Act. No desert tortoises or desert tortoise sign sign (i.e. scat, tracks) were associated with the burrow, and it is therefore considered inactive.

One desert kit fox (*Vulpes macrotis arsipus*) burrow with recent scat was observed in the Project survey area (Appendix A, Figure 3). Even though the desert kit fox does not have any legal status under the federal Endangered Species Act or the California Endangered Species Act, the species is native to the Mojave Desert and plays a key role in their respective ecosystems as "architects of subterranean burrows" (Thacker and Flinders 1999).

Table 3. Alta East Incidental Species Results. April/May 2011.

Find	Figure 3 ID Appendix A	Date	Sex	MCL (mm)	Class[1]	Dimensions W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
DETO burrow	DTB1	4.22.11	-	-	4	9-5->18	No	E	#1525_MG	Good dome shape, a little too steep (>30)
KFOX burrow	KFB1	5.2.11	-	-	-	8-6->24	No	SW	AG+LM	Scat

Class[1]
DETO BURROW- CLASS 4= good condition, possibly desert tortoise (DTC 1994)

4 References and Personal Communications

California Burrowing Owl Consortium (CBOC)

1993 Survey Protocol & Mitigation Guidelines. April.

California Department of Fish and Game (CDFG)

2011 Rarefind, a California Natural Diversity Database (CNDDB). A database of special status biological resources maintained by the Natural Heritage Division. Sacramento, California. Version 3.1.1. Accessed May 2011.

Desert Tortoise Council (DTC)

1994 Guidelines for Handling Desert Tortoises During Construction Projects. Edward L. LaRue, Jr., editor. Wrightwood, California. Revised 1999.

Holland, R. F.

1986 Preliminary descriptions of the terrestrial natural communities of California. California Department of Fish and Game. Unpublished report.

Phoenix Ecological Consulting

2010a Desert Tortoise (*Gopherus agassizii*) & Burrowing Owl (*Athene cunicularia*) Protocol Presence/Absence Surveys for Sun Creek Wind Resource Area, Kern County, California. Prepared for CH2M HILL. July 14.

2010b Burrowing Owl (*Athene cunicularia*) Protocol Presence/Absence Survey for Sun Creek Wind Resource Area, Kern County, California. Prepared for CH2M HILL. July 19.

Thacker, R. K. and J. T. Flinders

1999 Kit or swift fox: Vulpes velox. Pages 148-150 in Wilson, D. E. and S. Ruff, editors. The Smithsonian book of North American mammals. Smithsonian Institute Press, Washington and London. 750pp.

United States Fish and Wildlife Service (USFWS)

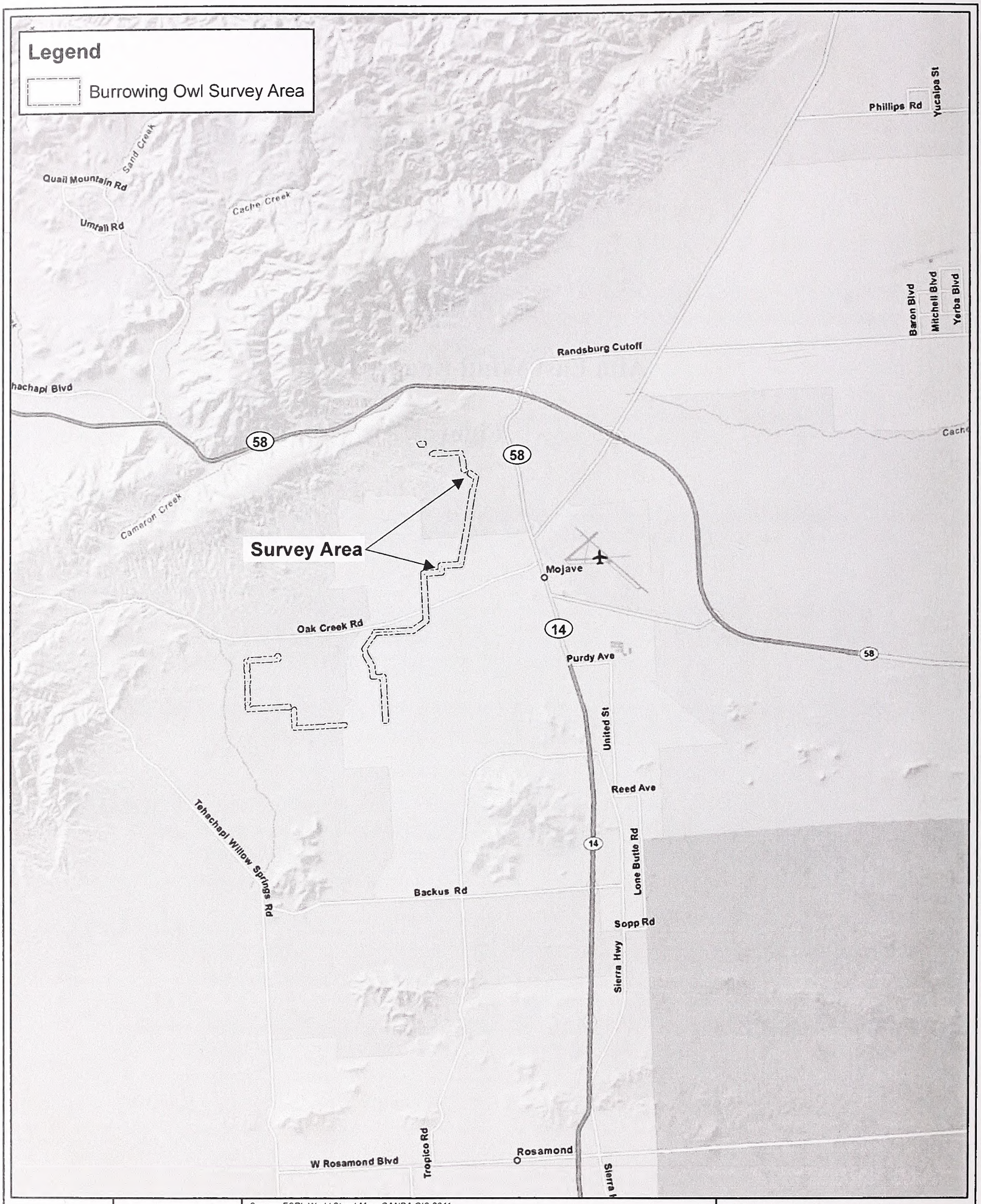
1999 Standardized Recommendations for Protection of the San Joaquin Kit Fox prior to or during ground disturbance.

2010 Preparing for any Action that May Occur within the Range of the Mojave Desert Tortoise (*Gopherus agassizii*). 2010 Field Season.

APPENDIX A

Alta East Wind Energy Project

Figures







Source: ESRI, World Street Map, GANDA GIS 2011

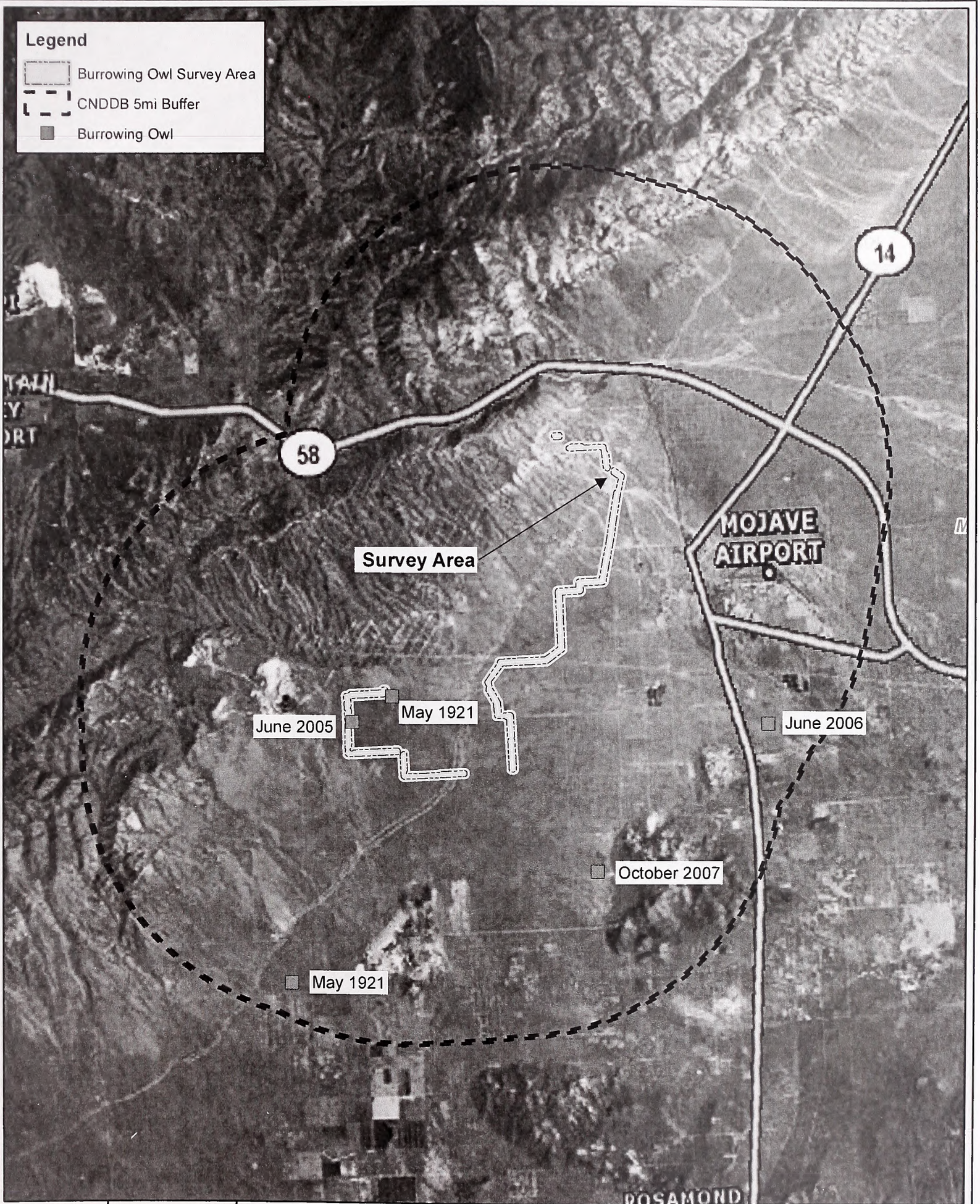
Kilometers
0 4
Miles
0 4

Figure 1. Project Location

Alta East Wind Energy Project

Kern County, CA

June 2011



GANDA

Project Location:

Source: ESRI, World Street Map; GANDA GIS 2011

0 4 Kilometers

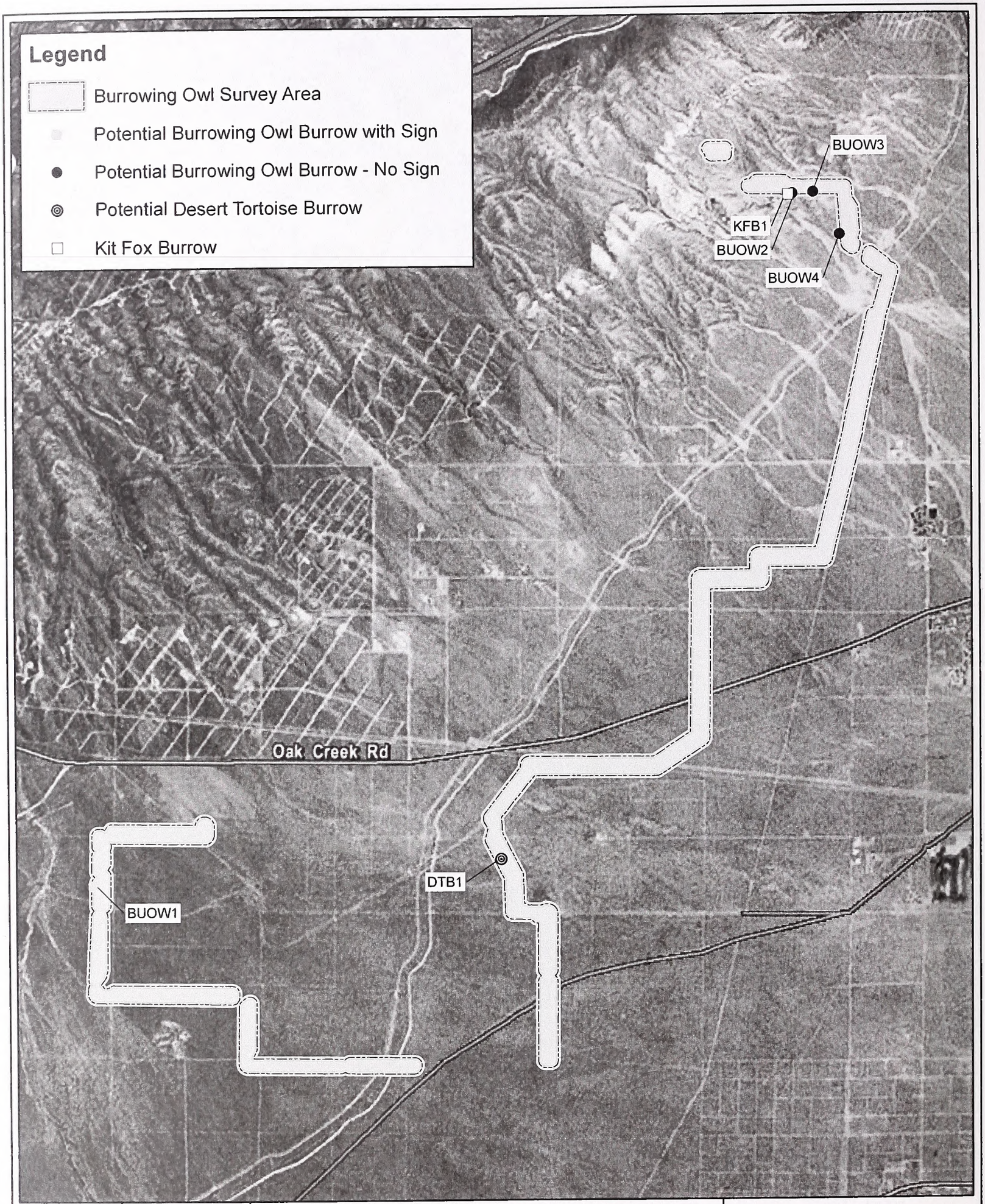
0 4 Miles

Figure 2. 5-mile CNDDB Burrowing Owl Occurrences

Alta East Wind Energy Project

Kern County, CA

June 2011



GANDA

Project Location:

Source: ESRI, World Street Map; GANDA GIS 2011

0 2 Kilometers

0 2 Miles

Figure 3. Project Survey Area and Results

Alta East Wind Energy Project

Kern County, CA

June 2011

APPENDIX B

Alta East Wind Energy Project

Representative Photos



Photo 1. Mojave Creosote Bush Scrub Habitat. Alta East 2011.



Photo 2. Joshua Tree Woodland Habitat. Alta East 2011.



Photo 3. Potential Burrowing Owl Burrow with Sign (BUOW1). April 20, 2011. Alta East.



Photo 4. Class 4- Potential Desert Tortoise Burrow (DTB1). April 22, 2011. Alta East.



Photo 3. Desert kit fox burrow (KFB1) with recent sign. Alta East 2011.

APPENDIX C

Alta East Wind Energy Project

Field Data Sheets

Sensitive Wildlife Survey Form

Date: 4/20/11

Start Time: 1030

End Time: 1600

Page 1 / 1

Biological Surveyor(s): M.Graber, L.Megill, M.Adam

Site/Engineering Feature: Alta East

GPS Name+File Name: Suncreek_BUOW_MG_042011

Habitat Community: Mojave Creosote Bush Scrub + J-tree woodland

Temperature Range: 59-64 °F Wind Speed Range 15-36

Cloud Cover Range 5-25 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
NA	Pot. BUOW with sign	-	-	-	-	No	East	12_LM	Whitewash

Incidental Species: black-tailed jackrabbit, California quail, common raven

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (Potential BUOW with/without sign, BUOW Occupied Burrow, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)
Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS (DTC 1994)
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS (USFWS 1992)
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
3=dry w/o glaze or odor; light brown, tightly packed
4=dry w/o glaze, yellow, loose material, scaly appearance
5=dry w/o glaze or odor, bleached (white)

LIVE DETO-CLASS
Condition: 1=healthy
2=evidence of URDS
3=shell cracked
4=peeling scutes
5=ticks
6=other

DETO CARCASS- CLASS (USFWS 1992)
1= fresh
2= normal color, scutes adhering to bone
3= scutes have peeled off bone
4= bones falling apart, growth rings on scutes are peeling
5= disarticulated and scattered

DETO SIGN OTHER- CLASS
1= egg shell
2= drinking site
3=courtship ring
4=evidence of fight
5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 4/22/11

Biological Surveyor(s): M.Graber, R.Hilgris, S.Deichsel, D.Beckett, S.Paris

Start Time: 0900

Site/Engineering Feature: Alta East

End Time: 1345

GPS Name+File Name: Suncreek_BUOW_MG_042211

Habitat Community: Mojave Creosote Bush Scrub

Temperature Range: 58 °F Wind Speed Range 10mph

Page 1 / 1

Cloud Cover Range 0 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
NA	DETO burrow	-	-	4	9-5->18	No	East	1525_MG	Good dome shape, a little too steep (>30)

Incidental Species: black-tailed jackrabbit, side-blotched lizard, greater roadrunner, desert woodrat, red-tailed hawk, Mojave rattlesnake, antelope ground squirrel, California quail, common raven, western whiptail, desert iguana

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (Potential BUOW with/without sign, BUOW Occupied Burrow, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)
Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS
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3= deteriorated, definitely DETO
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5=deteriorated, possibly DETO

DETO SCAT- CLASS
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3=courtship ring
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5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 4/26/11

Biological Surveyor(s): M.Graber, R.Hilgris, S.Scott, D.Beckett, S.Paris

Start Time: 0900

Site/Engineering Feature: Alta East

End Time: _____

GPS Name+File Name: Suncreek_BUOW_MG_042611

Habitat Community: Juniper woodland

Temperature Range: 60 °F Wind Speed Range 10mph

Page 1 / 1

Cloud Cover Range 0-5 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
	No Data Recorded								

Incidental Species:

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (Potential BUOW with/without sign, BUOW Occupied Burrow, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
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3=courtship ring
4=evidence of fight
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3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 4/28/11

Start Time: 0900

End Time: 1730

Page 1 / 1

Biological Surveyor(s): M.Graber, R.Hilgris, S.Scott, S.Paris, D.Beckett

Site/Engineering Feature: Alta East

GPS Name+File Name: Suncreek_BUOW_MG_042811

Habitat Community: TBD

Temperature Range: 55-65 °F Wind Speed Range 30-45

Cloud Cover Range 0-5 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
	No Data Recorded								
Incidental Species:									

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (Potential BUOW with/without sign, BUOW Occupied Burrow, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)
Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS
1= currently active, w/ DETO or recent sign
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3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS
1=wet or freshly dried, obvious odor
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5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 4/29/11

Biological Surveyor(s): M.Graber, S.Scott, S.Paris, D.Beckett

Start Time: 0900

Site/Engineering Feature: Alta East

End Time: 1630

GPS Name+File Name: Suncreek_BUOW_MG_042911

Habitat Community: Juniper woodland

Temperature Range: 50-65 °F Wind Speed Range 35-40

Page 1 / 1

Cloud Cover Range 0-5 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
	No Data Recorded								
Incidental Species:									

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (Potential BUOW with/without sign, BUOW Occupied Burrow, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)
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Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

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3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 4/30/11

Start Time: 0830

End Time: 1630

Page 1 / 1

Biological Surveyor(s): M.Graber, S.Scott, S.Paris, D.Beckett

Site/Engineering Feature: Alta East

GPS Name+File Name: Suncreek_BUOW_MG_043011

Habitat Community: Juniper woodland

Temperature Range: 55-65 °F Wind Speed Range 5-

Cloud Cover Range 0 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
	No Data Recorded								

Incidental Species:

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
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5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 5/2/11

Biological Surveyor(s): J.Finck, L.Megill, D.Beckett, S.Scott, R.Hilgris, A.Gallardo

Start Time: 0900

Site/Engineering Feature: Alta East

End Time: 1330

GPS Name+File Name: Iggy+ Suncreek_BUOW_Survey_Master

Habitat Community: Creosote Bush Scrub

Temperature Range: 60-80 °F Wind Speed Range 0-5

Page 1 / 1

Cloud Cover Range 0-3 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
25	KFOX burrow	-	-	-	8-6->24	No	SW	AG+LM	scat
26	Pot. BUOW no sign	-	-	-	6-4->12	No	West	-	approp. shape
27	Pot. BUOW no sign	-	-	-	7-5->12	No	East	-	approp. shape
28	Pot. BUOW no sign	-	-	-	7-6->12	No	East	-	approp. shape
Incidental Species: lesser nighthawk, California thrasher, western whiptail, antelope ground squirrel, greater roadrunner									

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (Potential BUOW with/without sign, BUOW Occupied Burrow, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)
Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

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5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

APPENDIX D

Alta East Wind Energy Project

Wildlife Observation List

Common Name	Scientific Name
Avian	
Mourning dove	*Zenaida macroura*
Chuckar	*Alectoris chukar*
California quail	*Callipepla californica*
Gambel's quail	*Callipepla gambelii*
Greater roadrunner	*Geococcyx californianus*
Western meadowlark	*Sturnella neglecta*
Dark-eyed junco	*Junco hyemalis*
Grasshopper sparrow	*Ammodramus savannarum*
Song sparrow	*Melospiza melodia*
Savanna sparrow	*Passerculus sandwichensis*
White-crowned sparrow	*Zonotrichia leucophrys*
Chipping sparrow	*Spizella passerina*
Lark sparrow	*Chondestes grammacus*
Cliff swallow	*Petrochelidon pyrrhonota*
Says phoebe	*Sayornis saya*
Gray flycatcher	*Empidonax wrightii*
Black-throated gray warbler	*Dendroica nigrescens*
Wilson's warbler	*Wilsonia pusilla*
Western kingbird	*Tyrannus verticalis*
Loggerhead shrike	*Lanius ludovicianus*
Black-headed grosbeak	*Pheucticus melanocephalus*
Sage thrasher	*Oreoscoptes montanus*
Costa's hummingbird	*Calypte costae*
Western scrub-jay	*Aphelocoma californica*
Common raven	*Corvus corax*
Burrowing owl	*Athene cunicularia*
American kestrel	*Falco sparverius*
Red-tailed hawk	*Buteo jamaicensis*
Red-shouldered hawk	*Buteo lineatus*
Reptiles	
Side-blotched lizard	*Uta stansburiana*
Western whiptail lizard	*Aspidoscelis tigris*
Zebra-tailed lizard	*Callisaurus draconoides*
Desert spiny lizard	*Sceloporus magister*
Desert horned lizard	*Phrynosoma platyrhinos*
Desert iguana	*Dipsosaurus dorsalis*
Gopher snake	*Pituophis catenifer catenifer*
Striped whipsnake	*Coluber taeniatus taeniatus*
Mojave rattlesnake	*Crotalus scutulatus*
Mammals	
Desert kangaroo rat	*Dipodomys deserti*
Antelope ground squirrel	*Ammospermophilus leucurus*
California ground squirrel	*Spermophilus beecheyi*
Desert cottontail rabbit	*Sylvilagus audubonii*
Black-tailed jackrabbit	*Lepus californicus*
Desert kit fox	*Vulpes macrotis arsipus*

Appendix D-20

Focused Burrowing Owl Phase I, II, and III Surveys

FOCUSED BURROWING OWL PHASE I, II, AND III SURVEYS

FOR THE

ALTA EAST WIND ENERGY PROJECT

KERN COUNTY, CALIFORNIA

November 2011

Prepared for:
CH2M Hill Engineers, Inc.
155 Grand Avenue
Oakland, CA 94612

Report Preparer:
Jacqueline Finck, Wildlife Biologist
Garcia and Associates
435 Lincoln Way
Auburn, California 95603

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Executive Summary

Alta Windpower Development, LLC proposes to construct and operate the Alta East Wind Energy Project (Project) in Kern County, California, a nominal 360 megawatt wind energy facility. The Project is located at the eastern base of the Tehachapi Mountains, 2 miles west of the intersection of Highway 58 and Highway 14 in the northwest portion of the Mojave Desert and is within the Tehachapi Wind Resource Area of eastern Kern County (Appendix A, Figure 1). The Project comprises approximately 3,200 acres, 2,083 acres of which are on federal land under the jurisdiction of the Bureau of Land Management (BLM) and 1,117 acres of which are on private land under the jurisdiction of Kern County.

The burrowing owl (*Athene cunicularia*) is a California Species of Special Concern, as well as a migratory bird species protected by the Migratory Bird Treaty Act (MBTA) of 1918. Protocol-level Phase I and II surveys were conducted concurrently by Garcia and Associates (GANDA), a subcontractor to CH2M HILL, between April 20 and May 2, and July 19–25, 2011 to determine presence or absence of individual owls or potential owl burrows in the Project survey area. Phase III surveys were conducted between June 15–18, and July 25–28, 2011 to determine owl presence in the Project survey area. Surveys were conducted in accordance with the burrowing owl protocol *California Burrowing Owl Consortium* (CBOC) *Survey Protocol & Mitigation Guidelines* (CBOC 1993). Previous surveys for burrowing owl were completed for the Alta East Wind Energy Project (Phoenix Ecological 2010a, 2010b). The 2011 surveys augment previously completed surveys within the Project area. Approximately 1,321 acres were surveyed for burrowing owl during this survey effort.

No burrowing owls were observed in the Project survey area during the surveys. Eight suspected burrowing owl burrows were observed in the Project survey area during the Phase I and II surveys; however, during the Phase III surveys, it was determined that no owls were using these burrows and they were therefore inactive.

1 Project and Property Description

1.1 Project Description

Alta Windpower Development, LLC proposes to construct and operate the Alta East Wind Energy Project (Project) in Kern County, California (Appendix A, Figure 1), a nominal 360 megawatt wind energy facility. Major components of the proposed Project include up to 120 wind turbine generators, a substation, a transmission interconnection, access roads, and ancillary services. The proposed Project site is described below.

1.2 Property Description

The Project is located at the eastern base of the Tehachapi Mountains, 2 miles west of the intersection of Highway 58 and Highway 14 (Appendix A, Figure 1) in the northwest portion of the Mojave Desert and is within the Tehachapi Wind Resource Area of eastern Kern County. The Project comprises approximately 3,200 acres, 2,083 acres of which are federal land and 1,117 acres of which are private land.

The Project site contains potentially suitable habitat for burrowing owl. Those areas of potentially suitable habitat that had not been previously surveyed in 2010 (Phoenix Ecological Consulting 2010a, 2010b), comprising 1,321 acres, are herein referred to as the Project survey area in this report (Appendix A, Figure 1). The eight suspected burrowing owl burrows observed in the Project survey area during Phase I and II surveys are herein referred to as the Phase III survey area (Appendix A, Figure 2). The Project survey area is covered with natural vegetation and, per the classification scheme developed by Holland (1986), is comprised primarily of Mojave creosote bush scrub communities. Elevations within the Project survey area range from approximately 3,000 to 3,900 feet. Representative photographs of the Project site are included in Appendix B.

2 Methods

2.1 Background Review

A background review was conducted to determine historical presence of burrowing owls on the Project survey area. The California Natural Diversity Data Base (CNDDB) was queried for any records of this species within a 5-mile radius of the Project. The search area for this background research included the two U.S. Geological Survey 7.5-minute quadrangles that include the Project survey area (Mojave and Monolith) and 10 adjacent quadrangles (Tehachapi North, Tehachapi NE, Tehachapi South, Cache Peak, Mojave NE, Sanborn, Tylerhorse Canyon, Willow Springs, Bissell, and Soledad Mountain).

The CNDDB query revealed five burrowing owl occurrences within 5 miles of the Project survey area (CDFG 2011; Appendix A, Figure 3). The nearest two burrowing owl records, from May 1921 and June 2005, occur within the southern portion of the Project survey area.

2.2 Field Survey

Phase I and II surveys for burrowing owl were conducted concurrently between April 20 and May 2, and July 19–25, 2011, and Phase III surveys for burrowing owl were conducted between June 15–18, and July 25–28, 2011 in accordance with the survey protocol (CBOC 1993). All surveys were conducted in accordance with the California Burrowing Owl Consortium (CBOC) *Survey Protocol & Mitigation Guidelines* (CBOC 1993). The purpose of a Phase I survey is to conduct an assessment of habitat suitability for burrowing owls. The purpose of a Phase II survey is to conduct a search for individual burrowing owls, as well as appropriately-sized burrows a burrowing owl could potentially use, if it has been determined during Phase I surveys that suitable burrowing owl habitat is present. The purpose of a Phase III survey is to determine owl presence on the site, and if possible, describe how owls are utilizing the site.

2.2.1 Phase I and II Surveys

The Project survey area included representative portions of the proposed wind energy facility, as well as the entirety of the proposed transmission line that would interconnect to the wind energy facility (Appendix A, Figure 3). Survey methods consisted of walking the entire Project survey area. Surveyors searched for individual owls, as well as burrows that had the potential for burrowing owl use, based on size. Presence of burrowing owl sign (whitewash, pellets, and feathers) was also noted at potential burrowing owl burrows. All potential burrowing owl burrows were inspected by using a mirror to reflect sunlight into the far end, if visible, to determine additional burrowing owl sign. It was noted when the end of a potential burrowing owl burrow was not visible. No burrows were collapsed or altered by surveyors during field surveys.

The entire Project survey area (Appendix A, Figure 1) was surveyed by spacing the transect centerlines a maximum of 100 feet apart during the species' breeding season (February 1 to August 31) (CBOC 1993). A Trimble® GEOXT GPS unit was used to maintain proper

orientation and spacing. The lead surveyor navigated by using the navigation feature on the map screen of the Trimble unit. This feature plotted the survey transect lines as the surveyors walked and allowed the lead surveyor to determine which areas had already been surveyed and to maintain the appropriate spacing between transect centerlines. Using this method, the survey area was systematically walked until 100 percent of the survey area was visually inspected.

All observations of owls, occupied burrows, and potential burrowing owl burrows were recorded on a Trimble® GEOXT GPS unit.

The field supervisor was GANDA biologists Molly Graber and Saana Deichsel. The other field surveyors were Margaret Adam, Jacqueline Finck, Steve Paris, Laura Megill, Ryan Hilgris, Debbie Beckett, Kim Steiner, Keir Morse, Sara McBee, and Angela Gallardo. All surveyors were trained in the implementation of the burrowing owl survey protocol and had previous experience surveying for burrowing owl. Field survey datasheets were completed each day and are included in Appendix C of this report.

2.2.2 Phase III Surveys

The Phase III survey area included the eight suspected burrowing owl burrows identified during Phase I and II surveys. Survey methods consisted of examining suspected burrowing owl burrows for owl sign (whitewash, pellets, and feathers), and observing burrows for owl presence from a fixed point to provide visual coverage and minimize disturbance. Site visits were repeated on four separate days. Surveys were conducted either two hours before sunset to one hour after sunset or from one hour before sunrise to two hours after sunrise.

All observations of owls, occupied burrows, and burrows with owl sign were noted on a handheld Trimble® Juno unit.

The field lead surveyor was GANDA biologists Jacqueline Finck and Saana Deichsel. The other field surveyors were Stefanie Krantz and Sara McBee. All surveyors were trained in the implementation of the burrowing owl survey protocol and had previous experience surveying for burrowing owl.

3 Results

This section describes the results of the protocol-level Phase I, II, and III surveys and incidental sensitive species observed during the surveys. All other wildlife observed during the field surveys are noted in Appendix D.

3.1 Phase I and II Surveys

3.1.1 Phase I Habitat Assessment

Suitable burrowing owl habitat was noted throughout the entire 1,321-acre Project survey area (Appendix A, Figure 1). Suitable burrowing owl habitat in the Project survey area consisted of desert habitat, low-growing vegetation with shrub canopy cover less than 30 percent of ground surface, and presence of fossorial mammal burrows and/or availability of man-made structures such as debris piles and culverts (CBOC 1993).

The Project survey area is covered with natural vegetation, mainly Mojave creosote bush scrub and Joshua tree woodland communities (Holland 1986). Topographical features included desert flats and alluvial fans. Elevations within the Project survey area range from approximately 3,000 to 3,900 feet.

3.1.2 Phase II Burrow Survey

No burrowing owls were observed in the Project survey area during the Phase II surveys. However, one suspected burrowing owl burrow with sign (whitewash) was observed in the Project survey area (Table 1; Appendix A, Figure 2 [BUOW1]). Seven additional suspected burrowing owl burrows without owl sign were also observed in the Project survey area (Table 1; Appendix A, Figure 2). Results are also documented on copies of the field data sheets provided in Appendix C.

Table 1. Alta East Burrowing Owl Phase I and II Survey Results. April, May, and July 2011.

Find	Figure 2 ID Appendix A	Date	Dimensions W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # Appendix B	Notes
Suspected Burrowing Owl Burrow with Owl Sign	BUOW1	4/20/11	-	No	E	Photo 2	whitewash
Suspected Burrowing Owl Burrow with No Owl Sign	BUOW2	5/2/11	6-4->12	No	W	Photo 3	-
Suspected Burrowing Owl Burrow with No Owl Sign	BUOW3	5/2/11	7-5->12	No	E	Photo 4	-
Suspected Burrowing Owl Burrow with No Owl Sign	BUOW4	5/2/11	7-6->12	No	E	Photo 5	-
Suspected Burrowing Owl Burrow with No Owl Sign	BUOW5	7/21/11	8-6-?	No	SE	Photo 6	-
Suspected Burrowing Owl Burrow with No Owl Sign	BUOW6	721/11	6-8-?	No	NE	Photo 7	-

Find	Figure 2 ID Appendix A	Date	Dimensions W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # Appendix B	Notes
Suspected Burrowing Owl Burrow with No Owl Sign	BUOW8	7/21/11	ME (3)	No	-	Photo 8	-
Suspected Burrowing Owl Burrow with No Owl Sign	BUOW7	7/22/11	10-12-?	No	E	-	-

3.1.2 Phase I and II Survey Data

Surveys were conducted during the day in weather that was conducive to observing owls outside their burrows and on days with good visibility and clear skies, little to moderate wind speeds, and no precipitation. Survey dates, time, weather data, and personnel used are provided in Table 2.

Table 2. Phase I and II Burrowing Owl Survey Dates, Time, Weather, and Personnel.

Date	Time	Weather	Biologist(s)
April 20, 2011	1030–1600	Temperature: 59–64°F Wind: 15–36 mph Cloud Cover: 5–25% Fog: none Precipitation: none	M.Graber L.Megill M.Adam
April 21, 2011	0700–1530	Temperature: 52–59°F Wind: 17–36 mph with 45 mph gust Cloud Cover: 5–18% Fog: none Precipitation: none	M.Graber L.Megill M.Adam S.Diechsel R.Hilgris
April 22, 2011	0900–1345	Temperature: 58°F Wind: 10 mph Cloud Cover: 0% Fog: none Precipitation: none	M.Graber S.Diechsel R.Hilgris D.Beckett S.Paris
April 26, 2011	0900–xxxx	Temperature: 60°F Wind: 10 mph Cloud Cover: 0–5% Fog: none Precipitation: none	M.Graber S.Scott R.Hilgris D.Beckett S.Paris
April 27, 2011	0815–1630	Temperature: 60–75°F Wind: 0–5 mph Cloud Cover: 0% Fog: none Precipitation: none	M.Graber S.Scott R.Hilgris S.Paris
April 28, 2011	0900–1730	Temperature: 55–65°F Wind: 30–45 mph Cloud Cover: 0–5% Fog: none Precipitation: none	M.Graber S.Scott R.Hilgris D.Beckett S.Paris
April 29, 2011	0900–1630	Temperature: 50–65°F Wind: 35–40 mph Cloud Cover: 0–5% Fog: none Precipitation: none	M.Graber S.Scott D.Beckett S.Paris
April 30, 2011	0830–1630	Temperature: 55–65°F Wind: 5 mph Cloud Cover: 0% Fog: none Precipitation: none	M.Graber S.Scott D.Beckett S.Paris

Date	Time	Weather	Biologist(s)
May 2, 2011	0900–1330	Temperature: 60–80°F Wind: 0–5 mph Cloud Cover: 0–3% Fog: none Precipitation: none	J.Finck L.Megill D.Beckett R.Hilgris S.Scott A.Gallardo
July 19, 2011	0730–1600	Temperature: 90–95°F Wind: 5 mph Cloud Cover: 5% Fog: none Precipitation: none	J.Finck S.Deichsel M.Adams K.Steiner K.Morse
July 20, 2011	0740–1415	Temperature: 70°F Wind: 5 mph Cloud Cover: 0% Fog: none Precipitation: none	M.Adams K.Steiner K.Morse
July 21, 2011	0715–1515	Temperature: 90–95°F Wind: 10 mph Cloud Cover: 5% Fog: none Precipitation: none	S.Deichsel K.Morse
July 22, 2011	0700–1530	Temperature: 95–100°F Wind: 5 mph Cloud Cover: 0% Fog: none Precipitation: none	S.Deichsel K.Steiner
July 25, 2011	1400–1730	Temperature: 70–80°F Wind: 5–15 mph Cloud Cover: 0% Fog: none Precipitation: none	S.Deichsel S.McBee

3.2 Phase III Surveys

No burrowing owls were observed at the eight suspected burrowing owl burrows during the Phase III surveys.

Summary data of all suspected burrowing owl burrows are provided in Table 3.

Table 3. Alta East Burrowing Owl Phase III Survey Results. June and July 2011.

Find	Figure 2 ID Appendix A	June 15	June 16	June 17	June 18	Photo # Appendix B	Notes
Suspected Burrowing Owl Burrow	BUOW1	No owl. No sign.	No owl. No sign.	No owl. No sign.	No owl. No sign.	Photo 2	Whitewash during Phase II surveys (April 20–May 2)
Suspected Burrowing Owl Burrow	BUOW2	No owl. No sign.	No owl. No sign.	No owl. No sign.	No owl. No sign.	Photo 3	No sign during Phase II surveys (April 20–May 2)
Suspected Burrowing Owl Burrow	BUOW3	No owl. No sign.	No owl. No sign.	No owl. No sign.	No owl. No sign.	Photo 4	No sign during Phase II surveys (April 20–May 2)
Suspected Burrowing Owl Burrow	BUOW4	No owl. No sign.	No owl. No sign.	No owl. No sign.	No owl. No sign.	Photo 5	No sign during Phase II surveys (April 20–May 2)
Suspected Burrowing Owl Burrow	BUOW5	No owl. No sign.	No owl. No sign.	No owl. No sign.	No owl. No sign.	Photo 6	No sign during Phase II surveys (July 19–25)
Suspected Burrowing Owl Burrow	BUOW6	No owl. No sign.	No owl. No sign.	No owl. No sign.	No owl. No sign.	Photo 7	No sign during Phase II surveys (July 19–25)

Find	Figure 2 ID Appendix A	June 15	June 16	June 17	June 18	Photo # Appendix B	Notes
Suspected Burrowing Owl Burrow	BUOW7	No owl. No sign.	No owl. No sign.	No owl. No sign.	No owl. No sign.	-	No sign during Phase II surveys (July 19–25)
Suspected Burrowing Owl Burrow	BUOW8	No owl. No sign.	No owl. No sign.	No owl. No sign.	No owl. No sign.	Photo 8	No sign during Phase II surveys (July 19–25)

3.2.1 Phase III Survey Data

Surveys were conducted in weather that was conducive to observing owls outside of their burrows (i.e., on days with good visibility and clear skies, little to moderate wind speeds, and no precipitation or fog). Summary data of burrowing owl survey dates, time, weather data, and personnel used are provided in Table 4.

Table 4. Phase III Burrowing Owl Survey Dates, Time, Weather, and Personnel.

Date	Time	Weather	Biologist(s)
June 15, 2011	1800–2000	Temperature: 65–70 F Wind: 10–20 mph Cloud Cover: 0% Fog: none Precipitation: none	J.Finck S.Krantz
June 16, 2011	0545–0729	Temperature: 60–65 F Wind: 0–5 mph Cloud Cover: 0% Fog: none Precipitation: none	J.Finck S.Krantz
June 17, 2011	0548–0748	Temperature: 58–62 F Wind: 0–15 mph Cloud Cover: 0% Fog: none Precipitation: none	J.Finck S.Krantz
June 18, 2011	0600–0715	Temperature: 60–65 F Wind: 0–15 mph Cloud Cover: 0% Fog: none Precipitation: none	J.Finck S.Krantz
July 25, 2011	1730–2030	Temperature: 70–80 F Wind: 5–15 mph Cloud Cover: 0% Fog: none Precipitation: none	S.Deichsel S.McBee
July 26, 2011	1745–2000	Temperature: 80–85 F Wind: 15–20 mph Cloud Cover: 0% Fog: none Precipitation: none	S.Deichsel S.McBee
July 27, 2011	1800–1900	Temperature: 80–85 F Wind: 15–20 mph Cloud Cover: 0% Fog: none Precipitation: none	S.Deichsel S.McBee
July 28, 2011	0530–0700	Temperature: 70–75 F Wind: 5 mph Cloud Cover: 0% Fog: none Precipitation: none	S.Deichsel S.McBee

3.3 Incidental Species Observations

A summary table of all incidental species observations is provided below in Table 5. Results are also documented in Appendix A, Figure 4, as well as on copies of the field data sheets provided in Appendix C.

Three live desert tortoises (*Gopherus agassizii*) were observed in the Project survey area (Table 5; Appendix A, Figure 4 [DETO1, DETO2, and DETO3]; Appendix B, photos 9–11). The desert tortoise is listed as a threatened species under the federal Endangered Species Act and the California Endangered Species Act. Each live desert tortoise was observed inside of a burrow (Class 1= currently active, with desert tortoise or recent sign) (DTC 1994). In addition, one Class 4 (good condition, possibly tortoise) desert tortoise burrow (DTB1) was also observed. No desert tortoise or desert tortoise sign (i.e., scat, tracks) was associated with the Class 4 desert tortoise burrow, and it is therefore considered inactive.

One desert kit fox (*Vulpes macrotis arsipus*) burrow with recent scat was observed in the Project survey area (Appendix A, Figure 2; Appendix B, Photo 12). The desert kit fox does not have any legal status under the federal Endangered Species Act or the California Endangered Species Act, however, the species is native to the Mojave Desert and plays a key role in their respective ecosystems as "architects of subterranean burrows" (Thacker and Flinders 1999).

Table 5. Alta East Incidental Species Results. April, May, and July 2011.

Find	Figure 3 ID Appendix A	Date	Sex	MCL (mm)	Class[1]	Dimensions W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # Appendix B	Notes
Live DETO	DETO1	7/25/11	U	U	1	13-17-?	No	S	Photo 9	Looks adult. Inside burrow.
Live DETO	DETO2	7/25/11	U	U	1	8-5-25	No	SE	Photo 10	Looks juvenile. Inside burrow.
Live DETO	DETO3	7/25/11	U	U	1	13-5-?	N	SE	Photo 11	Looks juvenile. Inside burrow.
DETO Burrow	DTB1	4/22/11	-	-	4	9-5->18	No	E	-	Good dome shape, a little too steep (>30° slope)
KFOX Burrow	KFB1	5/2/11	-	-	-	8-6->24	No	SW	Photo 12	Scat

Class[1]- DETO BURROW (DTC 1994)- CLASS 1= currently active, with desert tortoise or recent sign
CLASS 4= good condition, possibly desert tortoise

4 References

California Burrowing Owl Consortium (CBOC)

1993 Survey Protocol & Mitigation Guidelines. April.

California Department of Fish and Game (CDFG)

2011 Rarefind, a California Natural Diversity Database (CNDDB). A database of special status biological resources maintained by the Natural Heritage Division. Sacramento, California. Version 3.1.1. Accessed May 2011.

Holland, R. F.

1986 Preliminary descriptions of the terrestrial natural communities of California. California Department of Fish and Game. Unpublished report.

Phoenix Ecological Consulting

2010a Desert Tortoise (*Gopherus agassizii*) & Burrowing Owl (*Athene cunicularia*) Protocol Presence/Absence Surveys for Sun Creek Wind Resource Area, Kern County, California. Prepared for CH2M HILL. July 14.

2010b Burrowing Owl (*Athene cunicularia*) Protocol Presence/Absence Survey for Sun Creek Wind Resource Area, Kern County, California. Prepared for CH2M HILL. July 19.

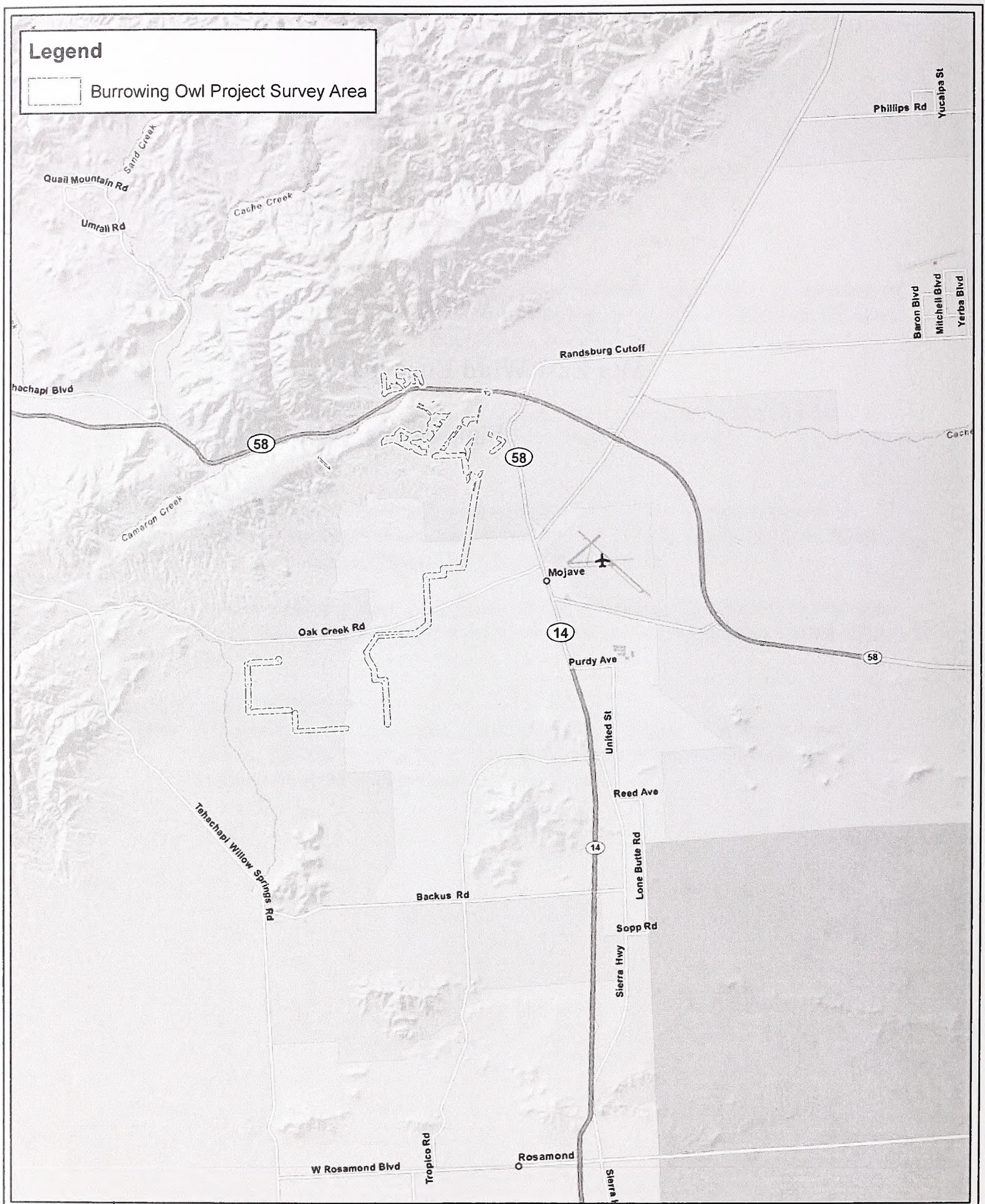
Thacker, R. K. and J. T. Flinders

1999 Kit or swift fox: Vulpes velox. Pages 148–150 in Wilson, D. E. and S. Ruff, editors. The Smithsonian book of North American mammals. Smithsonian Institute Press, Washington and London. 750pp.

APPENDIX A

Alta East Wind Energy Project

Figures



GANDA

Project Location

Source: ESRI, World Street Map, GANDA GIS 2011

Kilometers
0 4
Miles
0 4

Figure 1. Project Location

Alta East Wind Energy Project

Kern County, CA

August 2011



Legend

- ○ Phase III Burrowing Owl Survey Area- Suspected Burrowing Owl Burrows
- Burrowing Owl Project Survey Area

GANDA

Project Location:

Source: ESRI, World Street Map; GANDA GIS 2011

0 2 Kilometers

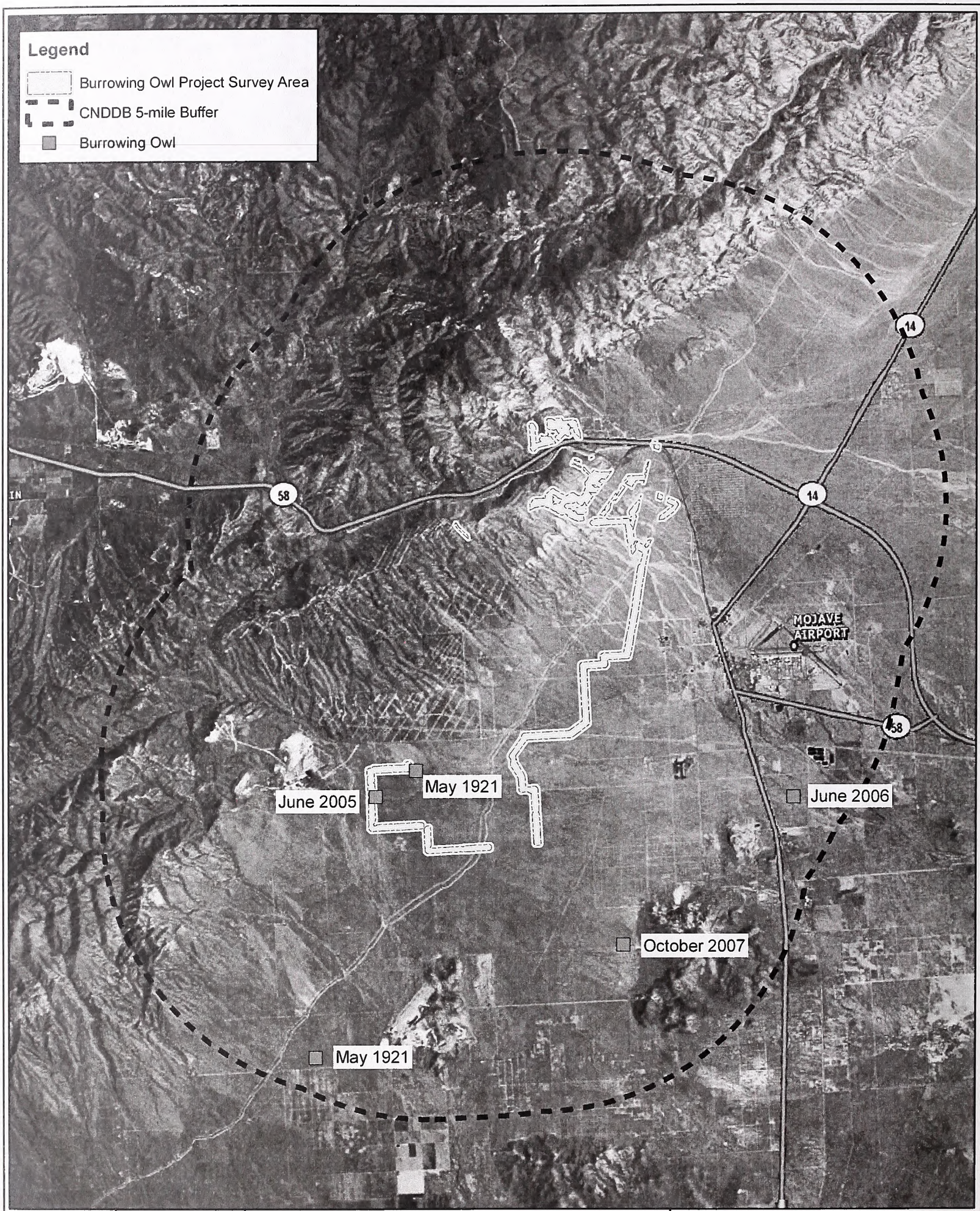
0 2 Miles

Figure 2. Phase III Burrowing Owl Survey Area

Alta East Wind Energy Project

Kern County, CA

August 2011



GANDA

Project Location:

Source: ESRI, World Street Map; GANDA GIS 2011

Kilometers
0 4

Miles
0 4

Figure 3. 5-mile CNDDB Burrowing Owl Occurrences

Alta East Wind Energy Project

Kern County, CA

August 2011



GANDA

Project Location:

Source: ESRI, I3_Imagery_Prime_World_2D; GANDA GIS 2011

0 2 Kilometers

0 2 Miles

Figure 4. Incidental Results

Alta East Wind Energy Project

Kern County, CA

August 2011

APPENDIX B

Alta East Wind Energy Project

Representative Photos

List of Representative Photos Alta East Burrowing Owl Phase I, II, and III Surveys 2011	
Survey Area Habitat Photos	
Photo 1	Mojave Creosote Bush Scrub Habitat
Potential Burrowing Owl Burrow Photos	
Photo 2	BUOW1
Photo 3	BUOW2
Photo 4	BUOW3
Photo 5	BUOW4
Photo 6	BUOW5
Photo 7	BUOW6
Photo 8	BUOW8
Incidental Species Photos	
Photo 9	Live Desert Tortoise and Class 1 Burrow (DETO1)
Photo 10	Live Desert Tortoise Inside Burrow (DETO2)
Photo 11	Live Desert Tortoise and Class 1 Burrow (DETO3)
Photo 12	Desert Kit Fox Burrow with recent sign (KFB1)



Photo 1. Mojave Creosote Bush Scrub Habitat.



Photo 2. Potential Burrowing Owl Burrow (BUOW1).

Left Photo: with owl sign on April 20, 2011, during Phase I and II surveys.
Right Photo: no owl sign on June 16, 2011, during Phase III surveys.



Photo 3. Potential Burrowing Owl Burrow (BUOW2).

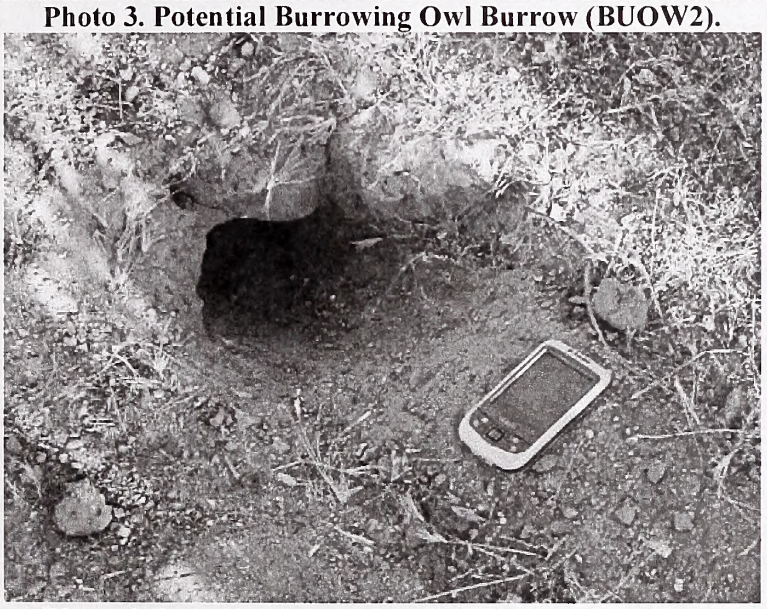


Photo 4. Potential Burrowing Owl Burrow (BUOW3).



Photo 5. Potential Burrowing Owl Burrow (BUOW4).



Photo 6. Potential Burrowing Owl Burrow (BUOW5).



Photo 7. Potential Burrowing Owl Burrow (BUOW6).

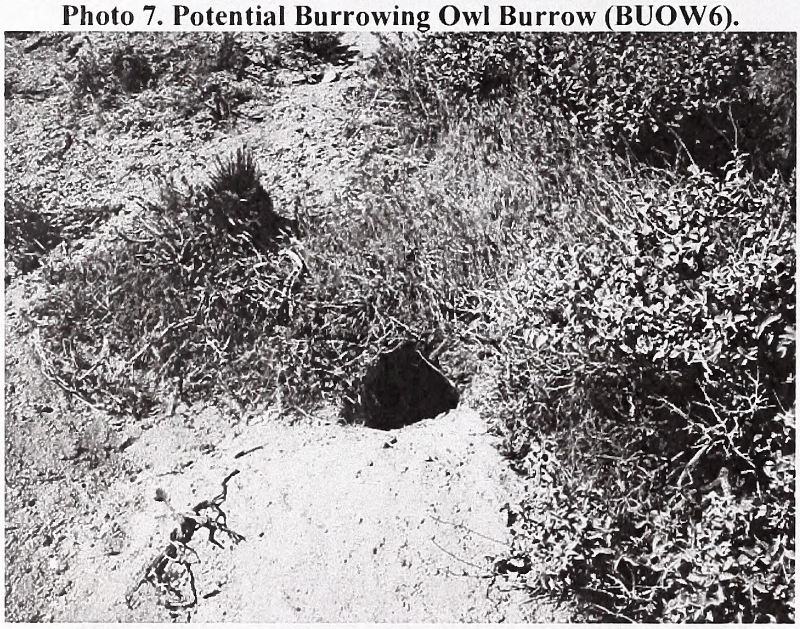


Photo 8. Potential Burrowing Owl Burrow (BUOW8).



Photo 9. Live Desert Tortoise and Class 1 Burrow (DETO1).

Left Photo: live desert tortoise inside burrow on July 25, 2011, during Phase III surveys.
Right Photo: Class 1 desert tortoise burrow on July 25, 2011, during Phase III surveys.



Photo 10. Live Desert Tortoise Inside Burrow (DETO2).



Photo 11. Live Desert Tortoise and Class 1 Burrow (DETO3).

Left Photo: Class 1 desert tortoise burrow on July 25, 2011, during Phase III surveys.
Right Photo: live desert tortoise inside burrow on July 25, 2011, during Phase III surveys.

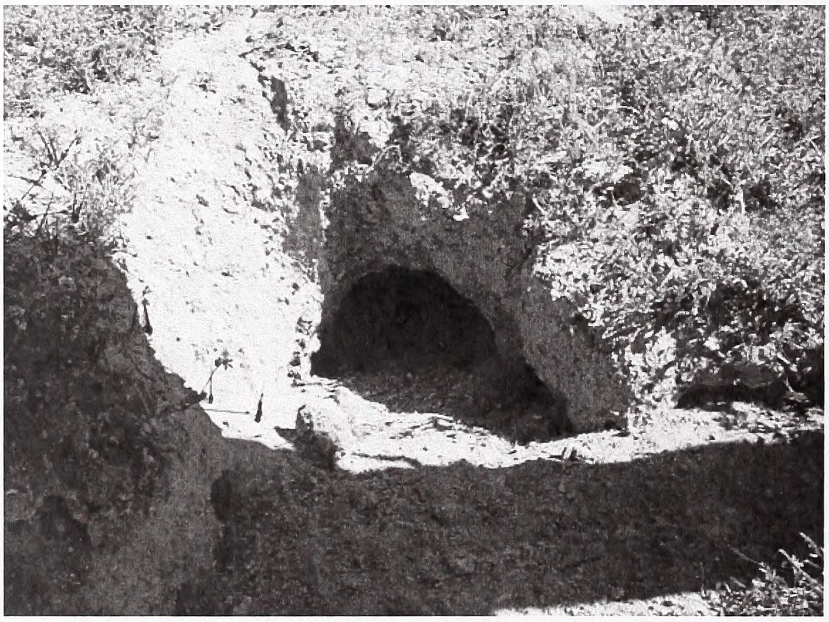


Photo 12. Desert Kit Fox Burrow (KFB1) with recent sign.

APPENDIX C

Alta East Wind Energy Project

Field Data Sheets

Sensitive Wildlife Survey Form

Date: 4/20/11

Biological Surveyor(s): M.Graber, L.Megill, M.Adam

Start Time: 1030

Site/Engineering Feature: Alta East

End Time: 1600

GPS Name+File Name: Suncreek_BUOW_MG_042011

Habitat Community: Mojave Creosote Bush Scrub + J-tree woodland

Temperature Range: 59-64 °F Wind Speed Range 15-36

Page 1 / 1

Cloud Cover Range 5-25 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
NA	Pot. BUOW with sign	-	-	-	-	No	East	12_LM	Whitewash

Incidental Species: black-tailed jackrabbit, California quail, common raven

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (Potential BUOW with/without sign, BUOW Occupied Burrow, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)
Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS (DTC 1994)
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS (USFWS 1992)
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
3=dry w/o glaze or odor; light brown, tightly packed
4=dry w/o glaze, yellow, loose material, scaly appearance
5=dry w/o glaze or odor, bleached (white)

LIVE DETO-CLASS
Condition: 1=healthy
2=evidence of URDS
3=shell cracked
4=peeling scutes
5=ticks
6=other

DETO CARCASS- CLASS (USFWS 1992)
1= fresh
2= normal color, scutes adhering to bone
3= scutes have peeled off bone
4= bones falling apart, growth rings on scutes are peeling
5= disarticulated and scattered

DETO SIGN OTHER- CLASS
1= egg shell
2= drinking site
3=courtship ring
4=evidence of fight
5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 4/22/11

Biological Surveyor(s): M.Graber, R.Hilgris, S.Deichsel, D.Beckett, S.Paris

Start Time: 0900

Site/Engineering Feature: Alta East

End Time: 1345

GPS Name+File Name: Suncreek_BUOW_MG_042211

Habitat Community: Mojave Creosote Bush Scrub

Temperature Range: 58 °F Wind Speed Range 10mph

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Cloud Cover Range 0 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
NA	DETO burrow	-	-	4	9-5->18	No	East	1525_MG	Good dome shape, a little too steep (>30)

Incidental Species: black-tailed jackrabbit, side-blotched lizard, greater roadrunner, desert woodrat, red-tailed hawk, Mojave rattlesnake, antelope ground squirrel, California quail, common raven, western whiptail, desert iguana

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (Potential BUOW with/without sign, BUOW Occupied Burrow, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)
Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
3=dry w/o glaze or odor; light brown, tightly packed
4=dry w/o glaze, yellow, loose material, scaly appearance
5=dry w/o glaze or odor, bleached (white)

LIVE DETO-CLASS
Condition: 1=healthy
2=evidence of URDS
3=shell cracked
4=peeling scutes
5=ticks
6=other

DETO CARCASS- CLASS
1= fresh
2= normal color, scutes adhering to bone
3= scutes have peeled off bone
4= bones falling apart, growth rings on scutes are peeling
5= disarticulated and scattered

DETO SIGN OTHER- CLASS
1= egg shell
2= drinking site
3=courtship ring
4=evidence of fight
5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 4/26/11

Start Time: 0900

End Time: _____

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Biological Surveyor(s): M.Graber, R.Hilgris, S.Scott, D.Beckett, S.Paris

Site/Engineering Feature: Alta East

GPS Name+File Name: Suncreek_BUOW_MG_042611

Habitat Community: Juniper woodland

Temperature Range: 60 °F Wind Speed Range 10mph

Cloud Cover Range 0-5 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
	No Data Recorded								

Incidental Species:

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (Potential BUOW with/without sign, BUOW Occupied Burrow, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)Mohave
Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
3=dry w/o glaze or odor; light brown, tightly packed
4=dry w/o glaze, yellow, loose material, scaly appearance
5=dry w/o glaze or odor, bleached (white)

LIVE DETO-CLASS
Condition: 1=healthy
2=evidence of URDS
3=shell cracked
4=peeling scutes
5=ticks
6=other

DETO CARCASS- CLASS
1= fresh
2= normal color, scutes adhering to bone
3= scutes have peeled off bone
4= bones falling apart, growth rings on scutes are peeling
5= disarticulated and scattered

DETO SIGN OTHER- CLASS
1= egg shell
2= drinking site
3=courtship ring
4=evidence of fight
5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 4/28/11

Start Time: 0900

End Time: 1730

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Biological Surveyor(s): M.Graber, R.Hilgris, S.Scott, S.Paris, D.Beckett

Site/Engineering Feature: Alta East

GPS Name+File Name: Suncreek_BUOW_MG_042811

Habitat Community: TBD

Temperature Range: 55-65 °F Wind Speed Range 30-45

Cloud Cover Range 0-5 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
	No Data Recorded								

Incidental Species:

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (Potential BUOW with/without sign, BUOW Occupied Burrow, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)
Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
3=dry w/o glaze or odor; light brown, tightly packed
4=dry w/o glaze, yellow, loose material, scaly appearance
5=dry w/o glaze or odor, bleached (white)

LIVE DETO-CLASS
Condition: 1=healthy
2=evidence of URDS
3=shell cracked
4=peeling scutes
5=ticks
6=other

DETO CARCASS- CLASS
1= fresh
2= normal color, scutes adhering to bone
3= scutes have peeled off bone
4= bones falling apart, growth rings on scutes are peeling
5= disarticulated and scattered

DETO SIGN OTHER- CLASS
1= egg shell
2= drinking site
3=courtship ring
4=evidence of fight
5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 4/29/11

Start Time: 0900

End Time: 1630

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Biological Surveyor(s): M.Graber, S.Scott, S.Paris, D.Beckett

Site/Engineering Feature: Alta East

GPS Name+File Name: Suncreek_BUOW_MG_042911

Habitat Community: Juniper woodland

Temperature Range: 50-65 °F Wind Speed Range 35-40

Cloud Cover Range 0-5 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
	No Data Recorded								

Incidental Species:

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (Potential BUOW with/without sign, BUOW Occupied Burrow, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)
Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
3=dry w/o glaze or odor; light brown, tightly packed
4=dry w/o glaze, yellow, loose material, scaly appearance
5=dry w/o glaze or odor, bleached (white)

LIVE DETO-CLASS
Condition: 1=healthy
2=evidence of URDS
3=shell cracked
4=peeling scutes
5=ticks
6=other

DETO CARCASS- CLASS
1= fresh
2= normal color, scutes adhering to bone
3= scutes have peeled off bone
4= bones falling apart, growth rings on scutes are peeling
5= disarticulated and scattered

DETO SIGN OTHER- CLASS
1= egg shell
2= drinking site
3=courtship ring
4=evidence of fight
5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 4/30/11

Biological Surveyor(s): M.Graber, S.Scott, S.Paris, D.Beckett

Start Time: 0830

Site/Engineering Feature: Alta East

End Time: 1630

GPS Name+File Name: Suncreek_BUOW_MG_043011

Habitat Community: Juniper woodland

Temperature Range: 55-65 °F Wind Speed Range 5-

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Cloud Cover Range 0 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
	No Data Recorded								

Incidental Species:

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (Potential BUOW with/without sign, BUOW Occupied Burrow, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)
Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
3=dry w/o glaze or odor; light brown, tightly packed
4=dry w/o glaze, yellow, loose material, scaly appearance
5=dry w/o glaze or odor, bleached (white)

LIVE DETO-CLASS
Condition: 1=healthy
2=evidence of URDS
3=shell cracked
4=peeling scutes
5=ticks
6=other

DETO CARCASS- CLASS
1= fresh
2= normal color, scutes adhering to bone
3= scutes have peeled off bone
4= bones falling apart, growth rings on scutes are peeling
5= disarticulated and scattered

DETO SIGN OTHER- CLASS
1= egg shell
2= drinking site
3=courtship ring
4=evidence of fight
5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 5/2/11

Biological Surveyor(s): J.Finck, L.Megill, D.Beckett, S.Scott, R.Hilgris, A.Gallardo

Start Time: 0900

Site/Engineering Feature: Alta East

End Time: 1330

GPS Name+File Name: Iggy+ Suncreek_BUOW_Survey_Master

Habitat Community: Creosote Bush Scrub

Temperature Range: 60-80 °F Wind Speed Range 0-5

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Cloud Cover Range 0-3 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
25	KFOX burrow	-	-	-	8-6->24	No	SW	AG+LM	scat
26	Pot. BUOW no sign	-	-	-	6-4->12	No	West	-	approp. shape
27	Pot. BUOW no sign	-	-	-	7-5->12	No	East	-	approp. shape
28	Pot. BUOW no sign	-	-	-	7-6->12	No	East	-	approp. shape

Incidental Species: lesser nighthawk, California thrasher, western whiptail, antelope ground squirrel, greater roadrunner

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (Potential BUOW with/without sign, BUOW Occupied Burrow, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)
Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
3=dry w/o glaze or odor; light brown, tightly packed
4=dry w/o glaze, yellow, loose material, scaly appearance
5=dry w/o glaze or odor, bleached (white)

LIVE DETO-CLASS
Condition: 1=healthy
2=evidence of URDS
3=shell cracked
4=peeling scutes
5=ticks
6=other

DETO CARCASS- CLASS
1= fresh
2= normal color, scutes adhering to bone
3= scutes have peeled off bone
4= bones falling apart, growth rings on scutes are peeling
5= disarticulated and scattered

DETO SIGN OTHER- CLASS
1= egg shell
2= drinking site
3=courtship ring
4=evidence of fight
5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 7.19.11

Biological Surveyor(s): J.Finck, S.Deichsel, K.Steiner, M.Adam, K.Morse

Start Time: 0730

Site/Engineering Feature: Alta East-Burrowing Owl

End Time: 1600

GPS Name+File Name: None

Habitat Community: creosote scrub, j-tree woodland

Temperature Range: 90-95 °F Wind Speed Range 5 mph

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Cloud Cover Range 5 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
-	None	-	-	-	-	-	-	-	-

Incidental Species: jack rabbit, whiptail, antelope ground squirrel

Photos:

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (BUOW Occupied Burrow w/ Sign, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)
Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS (DTC 1994)
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS (USFWS 1992)
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
3=dry w/o glaze or odor; light brown, tightly packed
4=dry w/o glaze, yellow, loose material, scaly appearance
5=dry w/o glaze or odor, bleached (white)

LIVE DETO-CLASS
Condition: 1=healthy
2=evidence of URDS
3=shell cracked
4=peeling scutes
5=ticks
6=other

DETO CARCASS- CLASS (USFWS 1992)
1= fresh
2= normal color, scutes adhering to bone
3= scutes have peeled off bone
4= bones falling apart, growth rings on scutes are peeling
5= disarticulated and scattered

DETO SIGN OTHER- CLASS
1= egg shell
2= drinking site
3=courtship ring
4=evidence of fight
5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 7.20.11

Biological Surveyor(s): K.Steiner, M.Adam, K.Morse

Start Time: 0740

Site/Engineering Feature: Alta East-Burrowing Owl

End Time: 1415

GPS Name+File Name: AE_KS_07202011

Habitat Community: eriog. Fasc. Shrubland

Temperature Range: 70 °F Wind Speed Range 0-5 mph

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Cloud Cover Range 0 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
-	None	-	-	-	-	-	-	-	-

Incidental Species:
Photos:

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (BUOW Occupied Burrow w/ Sign, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)
Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS (DTC 1994)
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS (USFWS 1992)
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
3=dry w/o glaze or odor; light brown, tightly packed
4=dry w/o glaze, yellow, loose material, scaly appearance
5=dry w/o glaze or odor, bleached (white)

LIVE DETO-CLASS
Condition: 1=healthy
2=evidence of URDS
3=shell cracked
4=peeling scutes
5=ticks
6=other

DETO CARCASS- CLASS (USFWS 1992)
1= fresh
2= normal color, scutes adhering to bone
3= scutes have peeled off bone
4= bones falling apart, growth rings on scutes are peeling
5= disarticulated and scattered

DETO SIGN OTHER- CLASS
1= egg shell
2= drinking site
3=courtship ring
4=evidence of fight
5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 7.21.11

Biological Surveyor(s): S.Deichsel, K.Morse

Start Time: 0715

Site/Engineering Feature: Alta East-Burrowing Owl

End Time: 1515

GPS Name+File Name: AE_KM_07212011

Habitat Community: creosote scrub, juniper woodland

Temperature Range: 90-95 °F Wind Speed Range 10 mph

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Cloud Cover Range 5 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
22	Pot. BUOW burrow- no sign	-	-	-	ME (3)	No	-	Yes	Aprons w/ no sign
24	Pot. BUOW burrow- no sign	-	-	-	8-6-?	No	SE	Yes	Possible fox burrow
25	Pot. BUOW burrow- no sign	-	-	-	6-8-?	No	NE	Yes	Steep entrance

Incidental Species:
Photos:

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (BUOW Occupied Burrow w/ Sign, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)
Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS (DTC 1994)
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS (USFWS 1992)
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
3=dry w/o glaze or odor; light brown, tightly packed
4=dry w/o glaze, yellow, loose material, scaly appearance
5=dry w/o glaze or odor, bleached (white)

LIVE DETO-CLASS
Condition: 1=healthy
2=evidence of URDS
3=shell cracked
4=peeling scutes
5=ticks
6=other

DETO CARCASS- CLASS (USFWS 1992)
1= fresh
2= normal color, scutes adhering to bone
3= scutes have peeled off bone
4= bones falling apart, growth rings on scutes are peeling
5= disarticulated and scattered

DETO SIGN OTHER- CLASS
1= egg shell
2= drinking site
3=courtship ring
4=evidence of fight
5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 7.22.11

Biological Surveyor(s): S.Deichsel, K.Steiner

Start Time: 0700

Site/Engineering Feature: Alta East-Burrowing Owl

End Time: 1530

GPS Name+File Name: AE_KS_07222011

Habitat Community: creosote scrub, juniper woodland

Temperature Range: 95-100 °F Wind Speed Range 5 mph

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Cloud Cover Range 0 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
4	Pot BUOW Burrow- no sign	-	-	-	10-12-?	No	E	-	-
Incidental Species:									
Photos:									

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (BUOW Occupied Burrow w/ Sign, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)
Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS (DTC 1994)
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS (USFWS 1992)
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
3=dry w/o glaze or odor; light brown, tightly packed
4=dry w/o glaze, yellow, loose material, scaly appearance
5=dry w/o glaze or odor, bleached (white)

LIVE DETO-CLASS
Condition: 1=healthy
2=evidence of URDS
3=shell cracked
4=peeling scutes
5=ticks
6=other

DETO CARCASS- CLASS (USFWS 1992)
1= fresh
2= normal color, scutes adhering to bone
3= scutes have peeled off bone
4= bones falling apart, growth rings on scutes are peeling
5= disarticulated and scattered

DETO SIGN OTHER- CLASS
1= egg shell
2= drinking site
3=courtship ring
4=evidence of fight
5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

Sensitive Wildlife Survey Form

Date: 7.25.11

Start Time: 1400

End Time: 1730

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Biological Surveyor(s): S.Deichsel, S.McBee

Site/Engineering Feature: Alta East-Burrowing Owl

GPS Name+File Name: AE_SD_07252011

Habitat Community: creosote scrub

Temperature Range: 70-80 °F Wind Speed Range 5-15 mph

Cloud Cover Range 0 % Precipitation w/in last 24hrs? ~~Yes~~ No

ID#	Find[1]	Sex	MCL (mm)	Class[2]	Dimensions[3] W-H-D (inches)	End Visible? (Y/N)	Burrow Orientation	Photo # and Photographer	Notes
2	Live DETO	U	U	1	13-7-?	N	S	SM	Looks adult-size. Inside burrow
3	Live DETO	U	U	1	8-5-25	N	SE	SM	Looks juvenile. Inside burrow
4	Live DETO	U	U	1	13-5-?	N	S	SM	Looks juvenile. Inside burrow

Incidental Species: California quail
Photos:

1 FIND

Desert Tortoise = (Live DETO, DETO Scat, DETO Carcass, DETO Burrow, DETO Sign Other)
Burrowing Owl = (BUOW Occupied Burrow w/ Sign, BUOW Unoccupied Burrow w/ Sign, BUOW Unoccupied Burrow w/o Sign)
Mohave Fringe-Toed Lizard = (MFTL)
Bird Nest= (Bird Active Nest, Bird Inactive Nest, Bird Unknown Nest Activity)
Other = (Other_*describe*) i.e. "Other_Badger" or "Other_Kfox"

2 Class

DETO BURROW- CLASS (DTC 1994)
1= currently active, w/ DETO or recent sign
2= good condition, definitely DETO, no evidence of recent use
3= deteriorated, definitely DETO
4= good condition, possibly DETO
5=deteriorated, possibly DETO

DETO SCAT- CLASS (USFWS 1992)
1=wet or freshly dried, obvious odor
2=dry w/ glaze and some odor, no bleaching (dark brown)
3=dry w/o glaze or odor; light brown, tightly packed
4=dry w/o glaze, yellow, loose material, scaly appearance
5=dry w/o glaze or odor, bleached (white)

LIVE DETO-CLASS
Condition: 1=healthy
2=evidence of URDS
3=shell cracked
4=peeling scutes
5=ticks
6=other

DETO CARCASS- CLASS (USFWS 1992)
1= fresh
2= normal color, scutes adhering to bone
3= scutes have peeled off bone
4= bones falling apart, growth rings on scutes are peeling
5= disarticulated and scattered

DETO SIGN OTHER- CLASS
1= egg shell
2= drinking site
3=courtship ring
4=evidence of fight
5= vegetation grazed

3 Dimensions: If burrow has only one entrance, measure size of burrow. If burrow has multiple burrow entrances, write 'ME' only; no measurements needed.

APPENDIX D

Alta East Wind Energy Project

Wildlife Observation List

Common Name	Scientific Name
Avian	
Mourning dove	*Zenaida macroura*
Chuckar	*Alectoris chukar*
California quail	*Callipepla californica*
Gambel's quail	*Callipepla gambelii*
Greater roadrunner	*Geococcyx californianus*
Western meadowlark	*Sturnella neglecta*
Dark-eyed junco	*Junco hyemalis*
Grasshopper sparrow	*Ammodramus savannarum*
Song sparrow	*Melospiza melodia*
Savanna sparrow	*Passerculus sandwichensis*
White-crowned sparrow	*Zonotrichia leucophrys*
Chipping sparrow	*Spizella passerina*
Lark sparrow	*Chondestes grammacus*
Cliff swallow	*Petrochelidon pyrrhonota*
Says phoebe	*Sayornis saya*
Gray flycatcher	*Empidonax wrightii*
Black-throated gray warbler	*Dendroica nigrescens*
Wilson's warbler	*Wilsonia pusilla*
Western kingbird	*Tyrannus verticalis*
Loggerhead shrike	*Lanius ludovicianus*
Black-headed grosbeak	*Phenecticus melanocephalus*
Sage thrasher	*Oreoscoptes montanus*
Costa's hummingbird	*Calypte costae*
Western scrub-jay	*Aphelocoma californica*
Common raven	*Corvus corax*
Burrowing owl	*Athene cunicularia*
American kestrel	*Falco sparverius*
Red-tailed hawk	*Buteo jamaicensis*
Red-shouldered hawk	*Buteo lineatus*
Reptiles	
Side-blotched lizard	*Uta stansburiana*
Western whiptail lizard	*Aspidoscelis tigris*
Zebra-tailed lizard	*Callisaurus draconoides*
Desert spiny lizard	*Sceloporus magister*
Desert horned lizard	*Phrynosoma platyrhinos*
Desert iguana	*Dipsosaurus dorsalis*
Gopher snake	*Pituophis catenifer catenifer*
Striped whipsnake	*Coluber taeniatus taeniatus*
Mojave rattlesnake	*Crotalus scutulatus*
Mammals	
Desert kangaroo rat	*Dipodomys deserti*
Antelope ground squirrel	*Ammospermophilus leucurus*
California ground squirrel	*Spermophilus beecheyi*
Desert cottontail rabbit	*Sylvilagus audubonii*
Black-tailed jackrabbit	*Lepus californicus*
Desert kit fox	*Vulpes macrotis arsipus*

Appendix D-21

Mohave Ground Squirrel Results 2006

Mohave Ground Squirrel Trapping Results

Prepared for:

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Prepared by:

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August 2006

INTRODUCTION

Oak Creek Energy Systems, Inc. is proposing to build wind powered turbine generators near Mojave, California. The property is very near wind energy developments. The project is approximately 0.5 mile west of Highway 58 and 3 miles north of Mojave, CA (Figure 1).

Project Name: Sun Creek **Property Owner:** USDI, Bureau of Land Management
Location: T 32S, R 35E, Sections 26, 27, &35 (MDBM) and T 12N, R 12W, Section 31 (SBM).
Quad Map: Mojave Quadrangle **UTM (NAD 27) Coordinates of Grid:** See Figure 1.
Acreage of Project Site: approximately one mile of new access roads

The purpose of this document is to present baseline data to be used to assess the presence of the California State threatened Mohave ground squirrel (*Spermophilus Mohavense*). Mohave ground squirrels (MGS) are approximately 8.5 - 9 inches in length and can be found in desert scrub habitats. Activity periods for this species vary and little is known about their reproduction (Ingles 1979). Their diet consists of seeds, vegetative parts of desert plants including fruits of the Joshua tree. Due to the aridity and high temperatures of its environment they are a diurnal species spending up to seven months underground. The MGS was delisted as threatened by California Department of Fish and Game Commission. The delistment action was challenged and the species remains on the threatened list until the courts decide otherwise.

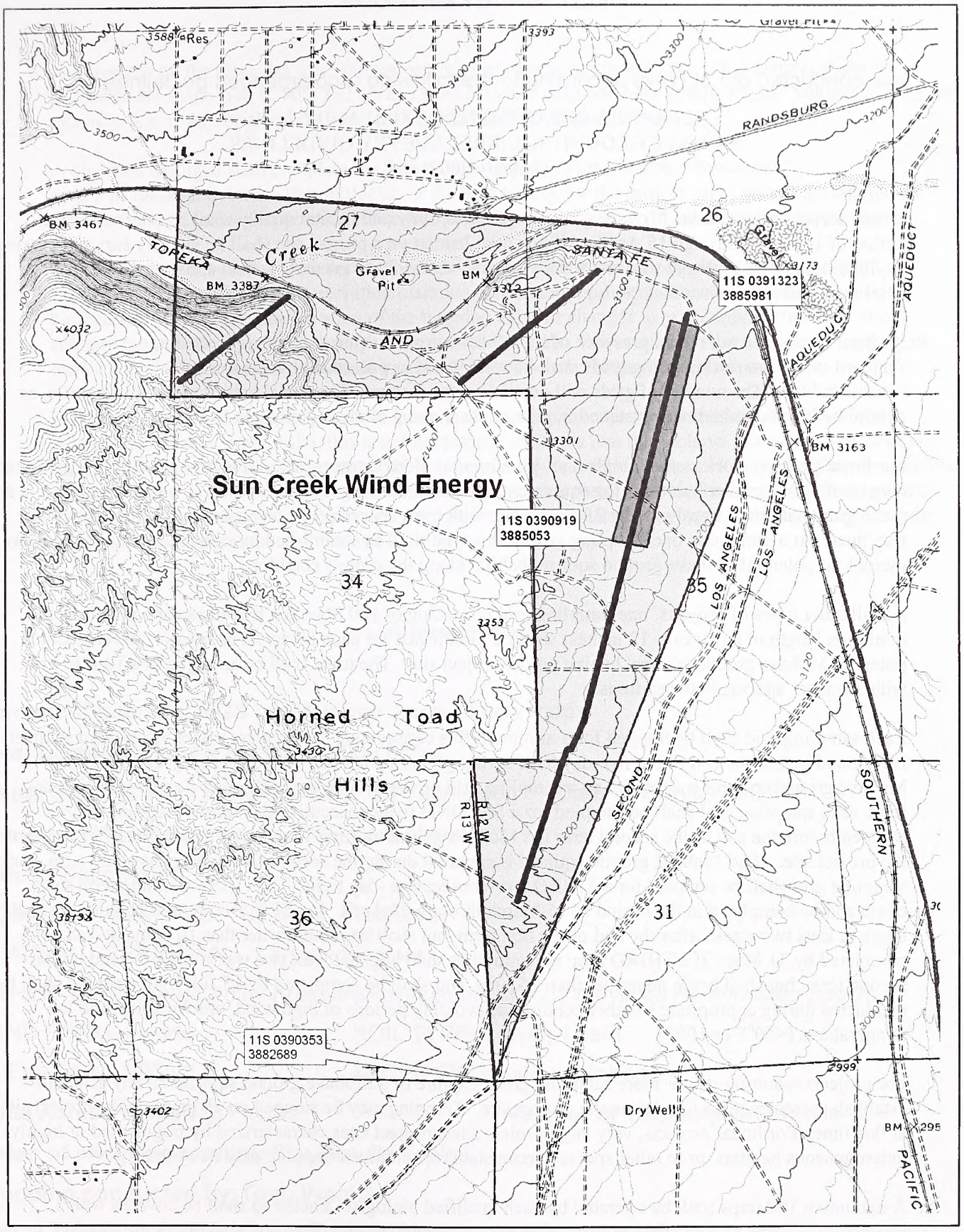


Figure 1. Project area and trapping grid location.

FIELD SURVEY METHODS

We conducted our surveys according to the following recommended guidelines.

CALIFORNIA DEPARTMENT OF FISH AND GAME
MOHAVE GROUND SQUIRREL SURVEY GUIDELINES
(January 2003)

1. Visual surveys to determine Mohave ground squirrel activity and habitat quality shall be undertaken the period of 15 March through 15 April. All potential habitat on a project site shall be visually surveyed during daylight hours by a biologist who can readily identify the Mohave ground squirrel and the white-tailed antelope squirrel (*Ammospermophilus leucurus*).

2. If visual surveys do not reveal presence of the Mohave ground squirrel on the project site, standard small-mammal trapping grids shall be established in potential Mohave ground squirrel habitat. The number of grids will depend on the amount of potential habitat on the project site, as determined by the guidelines presented in paragraphs 4 and 5 of these guidelines.

3. For linear projects (for example, highways, pipelines, or electric transmission lines), each sampling grid shall consist of 100 Sherman live-traps (or equivalent; the minimum length of any trap is 12 inches) arranged in a rectangular pattern, 4 traps wide by 25 traps long, with traps spaced 35 meters apart along each of the four trap lines. At a minimum, one sampling grid of this type shall be established in each linear mile, or fraction thereof, of potential Mohave ground squirrel habitat along the project corridor.

4. For all other types of projects, one sampling grid consisting of 100 Sherman live-traps (or equivalent; the minimum length of any trap is 12 inches) shall be established for each 80 acres, or fraction thereof, of potential Mohave ground squirrel habitat on the project site. The traps shall be arranged in a 10 x 10 grid, with 35-meter spacing between traps.

5. Each sampling grid shall be trapped for a minimum five consecutive days, unless a Mohave ground squirrel is captured before the end of the five-day term on the grid or on another grid on the project site. If no Mohave ground squirrel is captured on a sampling grid on the project site in the first five-consecutive-day term, each sampling grid shall be sampled for a SECOND five-consecutive-day term. Trapping may be stopped before the end of the second term if a Mohave ground squirrel is captured on any sampling grid on the project site. If no Mohave ground squirrel is captured during the second five-consecutive-day term, each sampling grid shall be sampled for a THIRD five-consecutive -day term. The FIRST trapping term shall begin and be completed in the period of 15 March through 30 April. If a SECOND term is required, it shall begin at least two weeks after the end of the first term, but shall begin no earlier than 01 May, and shall be completed by 31 May. If a THIRD term is required, it shall begin at least two weeks after the end of the second term, but shall begin no earlier than 15 June, and shall be completed by 15 July. All trapping shall be conducted during appropriate weather conditions, avoiding periods of high wind, precipitation, and low temperatures (<50°F or 10°C).

6. For projects requiring two or more sampling grids, capture of a Mohave ground squirrel on any grid will establish presence of the species on the project site. Trapping may be stopped on all grids on the project site at that time. For linear projects, very large project sites, project sites characterized by fragmented or highly-heterogeneous habitats, or in other special circumstances, continued trapping may be necessary.

8. A maximum 100 traps shall be operated by each qualified biologist. Each trap shall be covered with a cardboard A-frame or equivalent non-metal shelter to provide shade. Trap and shelter orientation shall be on a north-south axis. All traps shall be opened within one hour of sunrise and may be closed beginning one hour before sunset. Traps shall be checked at least once every four hours to minimize heat stress to captured animals. When traps are open, temperature shall be measured at a location within the sampling grid, in the shade, and one foot (approx. 0.3 meters) above the ground at least once every hour. Traps shall be closed when the ambient air temperature at one foot above the ground in the shade exceeds 90°F (32°C). Trapping

shall resume on the same day after the ambient temperature at one foot (approx. 0.3 meters) above the ground in the shade falls to 90°F (32°C) and shall continue until one hour before sunset. Suggested baits are mixed grains, rolled oats, or bird seed, with a small amount of peanut butter.

9. A qualified biologist shall complete the Survey and Trapping Form, which is found on page 5 of these guidelines. This biologist, or the lead agency for the project, shall submit the completed form to the appropriate Department office (see page 4) with the biological report on the project site.

10. The Department may allow variation on these guidelines, with the advance written approval of the appropriate regional habitat conservation planning office (see page 4). Such variations could include biologically-appropriate modification of the trapping dates or changes in grid configuration that would enhance the probability of detecting Mohave ground squirrels. Any variation which concerns trapping or marking methods must be incorporated into the MOU or permit that authorizes the work.

11. If a survey conducted according to these guidelines results in no capture or observation of the Mohave ground squirrel on a project site, this is not necessarily evidence that the Mohave ground squirrel does not exist on the site or that the site is not actual or potential habitat of the species. However, in the circumstance of such a negative result, the Department will stipulate that the project site harbors no Mohave ground squirrels. This stipulation will expire one year from the ending date of the last trapping on the project site conducted according to these guidelines.

Survey Results

Amount of potential MGS habitat: app 1 mile of new roads

Total Acreage Visually Surveyed: 900 acres

Visual Surveys were conducted by: Bill Vanherweg **Date of Survey:** 3/21/06

Results of Visual Survey: No MGS were observed

Habitat Description

DOMINANT ANNUALS - *Shizmus, Erodium*

DOMINANT PERRENIAL- *Larrea tridentata,*

OTHER- *Eriogonum, Cholla, Krashenakovia lanata, Yucca brevifolia Hymenoclea salsola*

LAND FORM- bajada SOIL TYPE- gravely Loam

ELEVATION- 3,250 ft SLOPE 5%, southeast facing

Total Acres Trapped: 31 acres **Number of Trapping Grids:** one

Dates of sampling term(s): See Results Tables

Trapping conducted by: Greg Warrick

No Mohave ground squirrels were captured at this grid, the following tables contain the number of antelope squirrels captured and weather conditions during our trapping sessions.

First Sampling Term

DATE	TIME	TEMP °F	CAPTURES AGS	CAPTURES MGS	Cloud Cover AM	Cloud Cover PM	Wind speed (Km/hr)/Dir. AM	Wind speed (Km/hr)/Dir. PM
4./10/06	0700	48	15	0	5%	90%	10-15sw	0-5sw
	1600	58						
4/11/06	0700	49	15	0	80%	95%	0-5sw	0-5sw
	1800	64						
4/12/06	0700	55	18	0	1%	1%	0-5w	0-5sw
	1800	77						
4/13/06	0715	54	27	0	10%	10%	0-5w	0-5w
	1745	78						
4/14/06	0715	62	14	0	100%	70%	10-15sw	10-15sw
	1615	69						

Second Sampling Term

DATE	TIME	TEMP °F	CAPTURES AGS	CAPTURES MGS	Cloud Cover AM	Cloud Cover PM	Wind speed (Km/hr)/Dir. AM	Wind speed (Km/hr)/Dir. PM
5/16/06	0630	79	4	0	30%	15%	0-5sw	
	1100	90+						
5/17/06	0615	77	11	0	40%	50%	5-10w	0-5w
	1300	90+						
5/18/06	0630	75	11	0	1%	0%	0-5e	0-5w
	1100	90+						
5/19/06	0630	75	15	0	0%	1%	5-10sw	10-15sw
	1300	90+						
5/20/06	0615	78	16	0	5%	5%	0-5w	10-15s
	1430	86						

Third Sampling Term

DATE	TIME	TEMP °F	CAPTURES AGS	CAPTURES MGS	Cloud Cover AM	Cloud Cover PM	Wind speed (mi/hr)/Dir. AM	Wind speed (mi/hr)/Dir. PM
7/4/06	0520	71	10	0	1%		5-10w	
	1045	90+						
7/5/06	0543	75	10	0	0%		0-5w	
	1100	90+						
7/6/06	0545	71	17	0	0%		5-10w	
	1126	90+						
7/7/06	0542	68	13	0	0%		5-10w	
	1055	90+						
7/8/06	0537	75	8	0	0%		0-5nw	
	0942	90						

REFERENCES AND LITERATURE CITED

Burt, W. B. and R. P. Grossenheimer. 1976. A field guide to the mammals. Houghton Mifflin Co. Boston, MA 289 pp.

California Department of Fish and Game. 2003. CDFG unpubl. guidelines. Mohave Ground Squirrel Survey Guidelines.

Ingles, Lloyd G. 1979. Mammals of the Pacific States. Stanford University Press, Stanford, CA. 506pp.

Appendix D-22

Mohave Ground Squirrel Results 2010

Alta Infill Wind Energy Project

Small Mammal Trapping Results

Prepared for:

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Prepared by:

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August 2010

INTRODUCTION

CH2M HILL contracted William J. Vanherweg, certified wildlife biologist, to conduct protocol small mammal surveys for the proposed Alta Infill Wind Project. Alta Windpower Development, LLC proposes to develop up to 192 MW of wind energy on approximately 1,460 acres of land in the Tehachapi region of Kern County, California. The purpose of this document is to present baseline data to be used to assess the presence of rare, threatened, or endangered mammal species at and/or near the project site near Mojave, California.

Applicable Laws, Ordinances, Regulations, and Standards

The laws, ordinances, regulations, and standards related to biological resources that potentially apply to the project are discussed below.

California Endangered Species Act (CESA): Compliance with the CESA is required because the project area is within habitats currently or historically occupied by the threatened desert tortoise (*Gopherus agassizii*) and Mohave ground squirrel (*Spermophilus mohavense*). If project field assessments indicate that there is a likelihood of "take" of these species, consultation with the California Department of Fish and Game (CDFG) under Fish and Game Code Section 2050 and 2091 will be required.

California Environmental Quality Act (CEQA): The effects of the project on environmental resources must be analyzed and assessed as to their significance using criteria provided in various sections and appendices of CEQA.

ENVIRONMENTAL SETTING

Vegetation

The project site (Figure 1) is predominantly creosote bush (*Larrea divericata*) scrub habitat with some Joshua tree woodland and Mixed Mojave scrub. All habitats exhibit light to moderate disturbance. Human disturbance near the project area include: urban/industrial development, scattered trash, State highway 58. The elevation of the site is approximately 3,000 to 4,400 feet above sea level.

Wildlife

General Wildlife. The desert scrub habitats in the project area support a wide variety of birds, mammals, and reptiles. Bird species include, but are not limited to red-tailed hawks (*Buteo jamaicensis*), burrowing owl (*Athene cunicularia*), western meadowlark (*Sturnella neglecta*), and Nevada loggerhead shrike (*Lanius ludoviciaus nevadensis*). Mammals occupying these habitat types are black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), kangaroo rat (*Dipodomys* spp.), deer mouse (*Peromyscus maniculatus*), desert kit fox (*Vulpes velox arsipus*), coyote (*Canis latrans*), and American badger (*Taxidae taxus*). Amphibians and reptiles include, side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), western rattlesnake (*Crotalus viridis*), and gopher snake (*Pituophis melanoleucus*).

Economically Important Species. There are no species of economic importance in the project area.

Biologically Sensitive Areas. The project lies outside any biologically sensitive area.

Studies Required

We conducted surveys to identify the presence of Mohave ground squirrel (MGS), and other sensitive small mammal species (i.e. Tulare grasshopper mouse and Tehachapi pocket mouse) that could be present near the project area. We used methodologies recommended by the California Department of Fish and Game (CDFG 2003).

Table 1. Sensitive species that potentially occur at the project site.

Species	Status
Mojave ground squirrel (*Spermophilus mojavensis*)	CT
Tulare grasshopper mouse (*Onychomys torridus tularensis*)	CSC
Tehachapi pocket mouse *(Perognathus alticola inexpectatus)*	CSC

Legend

CT= Listed as threatened by the state of California

CSC= California Species of Concern

The section below contains brief descriptions of each of the sensitive species contained in Table 1.

Mohave Ground Squirrel

Mohave ground squirrels are approximately 8.5 - 9 inches in length and can be found in desert scrub habitats. Activity periods for this species vary and little is known about their reproduction (Ingles 1979). Their diet consists of seeds, vegetative parts of desert plants including fruits of the Joshua tree. Due to the aridity and high temperatures of its environment they are a diurnal species spending up to seven months underground. The Mohave ground squirrel was delisted as threatened by California Department of Fish and Game Commission. The delistment action was challenged and the species remains on the threatened list until the courts decide otherwise. The species is currently being considered for listing under the federal Endangered Species Act as endangered (75 Fed. Reg. 22063).

Tulare Grasshopper Mouse

The Tulare grasshopper mouse appears to be primarily nocturnal and is active year-round (Williams unpubl. observ.as cited in Bolster, ed., 1998). Typical prey includes grasshoppers, crickets, caterpillars, moths, scorpions, and beetles (Bailey and Sperry 1929), but other foods such as seeds, a variety of other insects and spiders, reptiles and salamanders may also be eaten (Horner et al. 1964, McCarty 1975). Although grasshopper mice may construct nests in burrows which they excavate, they typically construct nests in burrows which have been abandoned by other rodents (Bailey and Sperry 1929). The Tulare grasshopper mouse is a state species of special concern, which does not confer any legal protections, but rather calls attention to a species that may be listed at some time in the future.

Tehachapi Pocket Mouse

The Tehachapi pocket mouse is medium-sized for the genus, averaging (5.9 and 6.5 in.) in total length for females and males, respectively (Best, 1994 Little is know about the ecology of the Tehachapi pocket mouse. Other members of the species group are nocturnal granivores, foraging primarily on seeds of grasses, forbs and annuals, but also on leafy plant material and insects (Verts and Kirkland, 1988). Most other members of the genus exhibit seasonal hibernation (Verts and Kirkland, 1988). The Tehachapi pocket mouse occupies native and non-native grasslands, Joshua tree woodland, pinyon-juniper woodland, yellow pine woodland and oak savannah (Williams et al., 1993). It constructs burrows in loose, sandy soils. The Tehachapi pocket mouse is a state species of special concern, which does not confer any legal protections, but rather calls attention to a species that may be listed at some time in the future.

FIELD SURVEY METHODS

Mohave Ground Squirrel

Surveys for Mohave ground squirrels were consistent with the survey guidelines issued by CDFG (CDFG, 2003)(Appendix 1).. After an evaluation of habitat suitability, six trapping grids were established along linear portions of the project including turbine strings and proposed access roads (Figure 1).

Tulare Grasshopper Mouse

Surveys for Tulare grasshopper mice were conducted by leaving the small mammal traps placed on grids to open for a maximum of four consecutive nights (Figure 1).

Tehachapi Pocket Mouse

Trapping for Tehachapi pocket mouse in appropriate habitats of the northwest portion of the project area (Figure 1) was conducted 20-23 July 2010. Twelve-inch Sherman live traps were set in two parallel lines along proposed turbine corridors. The traps were baited with bird seed at dusk and checked at dawn of the next day. Trap spacing was 50; 25 traps were placed at Grid 7, 20 traps were placed at Grid 8, and 30 traps were placed at Grid 9 (Figure 1).

INSERT FIGURE 1

RESULTS

Mohave Ground Squirrel

Visual Surveys were conducted by: Bill Vanherweg

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS – *Erodium cicutarium, Amsinkia sp., Bromus tectorum, Bromus madritensis., Mentzelia sp.*

DOMINANT PERENNIALS-, *Hymenoclea salsola, Yucca brevifolia, Ericameria sp., Chrysothamnus nauseosus,* Achnatherum sp.

OTHER PERENNIALS- Juniperus californicus, *Lycium andersonii, Tetradymia spinosa, Krashnekovia lanata, Cholla sp., Encelia farinosa. Eriogonum fasciculatum, Ephedra sp.*

Elevation – Approx. 3000 to 4,400 ft **Slope –** 0% - 3%

Trapping conducted by: William Vanherweg, Paul Vanherweg, and Mike McGovern.

Grid 1

First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS*	CAPTURES MGS*	Cloud Cover AM	Cloud Cover PM	Wind speed (Mi/hr) AM	Wind speed (Mi/hr) PM
3/26/2010	0700	42	1	0	10 %	CLEAR	10-15	10-15
	1700	51						
3/27/2010	0745	42	0	0	CLEAR	CLEAR	0-5	5-10
	1500	61						
3/28/2010	0730	57	2	0	CLEAR	CLEAR	0-5	0
	1500	70						
3/29/2010	0700	57	1	0	20%	10%	0-5	0-5
	1630	72						
3/30/2010	0630	47	0	0	10%	10%	5-10	30+
	1100	58						

Second Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS	CAPTURES MGS	Cloud Cover AM	Cloud Cover PM	Wind speed (Mi/hr) AM	Wind speed (Mi/hr) PM
5/4/2010	0645	59	2	0	CLEAR	CLEAR	10-20	10-20
	1500	80						
5/5/2010	0645	51	0	0	10%	20%	30+	30+
	1200	71						
5/6/2010	0645	54	0	0	5%	CLEAR	20-30	10-25
	1400	77						
5/7/2010	0640	40	2	0	CLEAR	CLEAR	0-5	0-5
	1600	80						
5/8/2010	0645	49	0	0	5%	CLEAR	0-5	10-25
	1300	74						

Third Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS	CAPTURES MGS	Cloud Cover AM	Cloud Cover PM	Wind speed (Mi/hr) AM	Wind speed (Mi/hr) PM
7/06/2010	0600	73	0	0	0 %	0 %	0-5	0-5
	1000	90+						
7/07/2010	0600	71	8	0	0 %	0 %	5-10	0-5
	1000	90+						
7/08/2010	0600	68	2	0	0 %	0 %	0-5	0-5
	1000	90+						
7/09/2010	0600	68	1	0	0 %	0 %	0-5	0-5
	0930	90+						
7/10/2010	0600	78	1	0	80 %	10 %	5-10	0-5
	0830	90+						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grid 2

First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS*	MGS*	Cloud Cover AM	PM	Wind speed (Mi/hr) AM	PM
3/26/2010	0700	42	0	0	10 %	CLEAR	10-15	10-15
	1700	51						
3/27/2010	0745	42	6	0	CLEAR	CLEAR	0-5	5-10
	1500	61	1 CAGS					
3/28/2010	0730	57	1	0	CLEAR	CLEAR	0-5	0
	1500	70						
3/29/2010	0700	57	2	0	20%	10%	0-5	0-5
	1630	72						
3/30/2010	0630	47	0	0	10%	10%	5-10	30+
	1100	58						

Second Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS	MGS	Cloud Cover AM	PM	Wind speed (Mi/hr) AM	PM
5/4/2010	0645	59	0	0	CLEAR	CLEAR	3 SW	21-32 W
	1500	80						
5/5/2010	0645	51	0	0	10%	20%	14 SSW	17-23 SW
	1200	71						
5/6/2010	0645	54	0	0	5%	CLEAR	0	12-20 SSW
	1400	77						
5/7/2010	0640	40	2	0	CLEAR	CLEAR	3 WSW	7-17 SSE
	1600	80						
5/8/2010	0645	49	0	0	5%	CLEAR	3 SW	20-26 S
	1300	74						

Third Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS	MGS	Cloud Cover AM	PM	Wind speed (Mi/hr) AM	PM
7/06/2010	0600	73	1	0	0 %	0 %	0-5	0-5
	1000	90+						
7/07/2010	0600	71	2	0	0 %	0 %	5-10	0-5
	1000	90+						
7/08/2010	0600	68	2	0	0 %	0 %	0-5	0-5
	1000	90+						
7/09/2010	0600	68	2	0	0 %	0 %	0-5	0-5
	0930	90+						
7/10/2010	0600	78	0	0	80 %	10 %	5-10	0-5
	0830	90+						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grid 3

First Sampling Term

DATE	TIME	TEMP °F	CAPTURES AGS*	CAPTURES MGS*	Cloud Cover AM	Cloud Cover PM	Wind speed (mi/hr) AM	Wind speed (mi/hr) PM
3/31/10	0700	58	0	0	15	20	30	30
	1300	68						
4/1/10	0700	45	0	0	10	10	20	30
	1500	69						
4/2/10	0700	42	7	0	0	100	18	25
	1400	75						
4/3/10	0700	48	7	0	80	80	5	30
	1300	69						
4/4/10	0700	35	2	0	80	70	5	10
	1200	58						

Second Sampling Term

DATE	TIME	TEMP °F	CAPTURES AGS	CAPTURES MGS	Cloud Cover AM	Cloud Cover PM	Wind speed (mi/hr) AM	Wind speed (mi/hr) PM
5/1/10	0630	50	2	0	0	0	10	25
	1400	70						
5/2/10	0630	56	2	0	20	0	12	5
	1500	77						
5/3/10	0700	50	4	0	0	0	5	20
	1500	80						
5/4/10	0630	63	1	0	0	0	30	30
	1330	81						
5/5/10	0630	54	1	0	0	0	35	30
	1400	75						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Third Sampling Term (Turbine corridor removed from further consideration; not trapped)

Grid 4

First Sampling Term

DATE	TIME	TEMP °F	CAPTURES AGS*	CAPTURES MGS*	Cloud Cover AM	Cloud Cover PM	Wind speed (mi/hr) AM	Wind speed (mi/hr) PM
3/31/10	0700	58	0	0	15	20	30	30
	1300	68						
4/1/10	0700	45	0	0	10	10	20	30
	1500	69						
4/2/10	0700	42	7	0	0	100	18	25
	1400	75						
4/3/10	0700	48	7	0	80	80	5	30
	1300	69						
4/4/10	0700	35	2	0	80	70	5	10
	1200	58						

Second Sampling Term

DATE	TIME	TEMP °F	CAPTURES AGS	CAPTURES MGS	Cloud Cover AM	Cloud Cover PM	Wind speed (mi/hr) AM	Wind speed (mi/hr) PM
5/6/10	0630	49	2	0	0	0	5	20
	1400	75						
5/7/10	0630	49	2	0	0	0	0	0
	1400	82						
5/8/10	0630	62	1	0	0	0	30	25
	1400	76						
5/9/10	0630	55	4	0	0	25	20	15
	1100	65						
5/10/10	0630	47	2	0	20	20	20	25
	1300	64						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Third Sampling Term (Turbine corridor removed from further consideration; not trapped)

Grid 5

First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS* A-B	MGS*	Cloud Cover AM	PM	Wind speed (Mi/hr) AM	PM
4/6/2010	0700	42	4-3	0	CLEAR	CLEAR	5-10	5-10
	1530	65						
4/7/2010	0700	40	0-7	0	CLEAR	CLEAR	0-5	0-5
	1500	71						
4/8/2010	0630	49	1-5	0	CLEAR	CLEAR	0-5	5-10
	1530	73						
4/9/2010	0630	50	0-3	0	CLEAR	CLEAR	0-5	10-15
	1500	75						
4/10/2010	0700	45	0-2	0	30%	20%	0-5	5-10
	1500	65						

Second Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS A-B	MGS	Cloud Cover AM	PM	Wind speed (Mi/hr) AM	PM
5/17/2010	0700	59	1-3	0	100%	100%	5-10	10-20
	1530	67						
5/18/2010	0630	50	4-5	0	10%	20%	0-5	10-25
	1500	72						
5/19/2010	0630	56	3-5	0	CLEAR	CLEAR	5-10	15-30
	1400	81						
5/20/2010	0630	59	1-0	0	20%	CLEAR	10-20	15-35
	0930	63						
5/21/2010	0630	58	0-0	0	CLEAR	CLEAR	15-25	20-40
	1030	66						

Third Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS B	MGS	Cloud Cover AM	PM	Wind speed (Mi/hr) AM	PM
7/11/2010	0600	73	4	0	50 %	20 %	5-10	5-10
	0845	90+						
7/12/2010	0600	71	8	0	10 %	10 %	0-5	5-10
	0845	90+						
7/13/2010	0600	68	9	0	0 %	0 %	10-15	5-10
	0915	90+						
7/14/2010	0600	68	4	0	0 %	0 %	0-5	0-5
	0915	90+						
7/15/2010	0600	78	8	0	0 %	0 %	0-5	0-5
	0830	90+						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grid 6

First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS*	CAPTURES MGS*	Cloud Cover AM	Cloud Cover PM	Wind speed (Mi/hr) AM	Wind speed (Mi/hr) PM
4/6/2010	0700	42	3	0	CLEAR	CLEAR	5-10	5-10
	1530	65						
4/7/2010	0700	40	1	0	CLEAR	CLEAR	0-5	0-5
	1500	71						
4/8/2010	0630	49	1	0	CLEAR	CLEAR	0-5	5-10
	1530	73						
4/9/2010	0630	50	3	0	CLEAR	CLEAR	0-5	10-15
	1500	75						
4/10/2010	0700	45	2	0	30%	20%	0-5	5-10
	1500	65						

Second Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS	CAPTURES MGS	Cloud Cover AM	Cloud Cover PM	Wind speed (Mi/hr) AM	Wind speed (Mi/hr) PM
5/17/2010	0700	59	4	0	100%	100%	5-10	10-20
	1530	67						
5/18/2010	0630	50	2	0	10%	20%	0-5	10-25
	1500	72						
5/19/2010	0630	56	1	0	CLEAR	CLEAR	5-10	15-30
	1400	81						
5/20/2010	0630	59	0	0	20%	CLEAR	10-20	15-35
	0930	63						
5/21/2010	0630	58	0	0	CLEAR	CLEAR	15-25	20-40
	1030	66						

Third Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS	CAPTURES MGS	Cloud Cover AM	Cloud Cover PM	Wind speed (Mi/hr) AM	Wind speed (Mi/hr) PM
7/11/2010	0600	73	6	0	50 %	20 %	5-10	5-10
	0845	90+						
7/12/2010	0600	71	21	0	10 %	10 %	0-5	5-10
	0845	90+						
7/13/2010	0600	68	25	0	0 %	0 %	10-15	5-10
	0915	90+						
7/14/2010	0600	68	17	0	0 %	0 %	0-5	0-5
	0915	90+						
7/15/2010	0600	78	13	0	0 %	0 %	0-5	0-5

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Tulare Grasshopper Mouse and Tehachapi Pocket Mouse Nocturnal Trapping

No Tulare grasshopper mice or Tehachapi pocket mice were captured during our surveys.

Other Species

San Joaquin pocket mice (*Perognathus inornatus* ssp.) were captured at Grids 5, 6, 7 and 9. This species is also a state species of special concern, which does not confer any legal protections, but rather calls attention to a species that may be listed at some time in the future. Also captured were several grasshopper mice of the subspecies *O. t. pulcher,* Panamint kangaroo rat (*Dipodomys panamintinus*), Deer mice (*Peromyscus maniculatus*), Merriam's kangaroo rat, (*D. merriami*), desert woodrat (*Neotoma lepida*), and parasitic mouse *(Peromyscus californicus)*. The following table shows survey dates and total number of captures of nocturnal sensitive small mammals.

NOCTURNAL SENSITIVE SMALL MAMMAL CAPTURES

Survey Period	Tulare Grasshopper Mouse	Tehachapi Pocket Mouse	San Joaquin Pocket Mouse
Grid 1 5-8 May 2010	0	No habitat	0
Grid 2 5-8 May 2010	0	No habitat	0
Grid 3 2-5 May 2010	0	No habitat	0
Grid 4 7-10 May 2010	0	No habitat	0
Grid 5 18-21 May 2010	0	No habitat	1
Grid 6 18-21 May 2010	0	No habitat	4
Grid 7 20-23 July 2010	0	0	2
Grid 8 20-23 July 2010	0	0	0
Grid 9 20-23 July 2010	0	0	3

REFERENCES AND LITERATURE CITED

Bailey, V., and C.C. Sperry. 1929. Life history and habits of the grasshopper mice, genus *Onychomys*. U.S. Dept. Agric. Tech. Bull. 145:1-19.

Best, T.L. 1994. *Perognathus alticolus*. Mammalian Species 463:1-4. California Natural Diversity Data Base (CNDDB).

Bolster, B.C. Ed. 1998. Terrestrial Mammal Species of Special Concern in California.

Burt, W. B. and R. P. Grossenheimer. 1976. A field guide to the mammals. Houghton Mifflin Co. Boston, MA 289 pp.

California Department of Fish and Game. 2003. CDFG unpubl. guidelines. Mohave Ground Squirrel Survey Guidelines.

California Department of Fish and Game. 2010. California Natural Diversity Data Base Records.

Horner, B.E., J.M. Taylor, and H.A. Padykula. 1964. Food habits and gastric morphology of the grasshopper mouse. J. Mammal. 45:513-535.

Ingles, Lloyd G. 1979. Mammals of the Pacific States. Stanford University Press, Stanford, CA. 506pp.

McCarty, R. 1975. *Onychomys torridus*. Mammal. Species 59:1-5.

Verts, B.J, and G.L. Kirkland. 1988. *Perognathus parvus*. Mammalian Species 318: 1-8.

Williams, D.F., H.H. Genoways, and J.K. Braun. 1993. Taxonomy. pp. 36-196. *In:* H.H. Genoways and J.H. Brown (eds.), Biology of the Heteromyidae. Special Publication, The American Society of Mammalogists.

Appendix 1

CALIFORNIA DEPARTMENT OF FISH AND GAME
MOHAVE GROUND SQUIRREL SURVEY GUIDELINES
(January 2003)

1. Visual surveys to determine Mohave ground squirrel activity and habitat quality shall be undertaken the period of 15 March through 15 April. All potential habitat on a project site shall be visually surveyed during daylight hours by a biologist who can readily identify the Mohave ground squirrel and the white-tailed antelope squirrel (*Ammospermophilus leucurus*).

2. If visual surveys do not reveal presence of the Mohave ground squirrel on the project site, standard small-mammal trapping grids shall be established in potential Mohave ground squirrel habitat. The number of grids will depend on the amount of potential habitat on the project site, as determined by the guidelines presented in paragraphs 4 and 5 of these guidelines.

3. For linear projects (for example, highways, pipelines, or electric transmission lines), each sampling grid shall consist of 100 Sherman live-traps (or equivalent; the minimum length of any trap is 12 inches) arranged in a rectangular pattern, 4 traps wide by 25 traps long, with traps spaced 35 meters apart along each of the four trap lines. At a minimum, one sampling grid of this type shall be established in each linear mile, or fraction thereof, of potential Mohave ground squirrel habitat along the project corridor.

4. For all other types of projects, one sampling grid consisting of 100 Sherman live-traps (or equivalent; the minimum length of any trap is 12 inches) shall be established for each 80 acres, or fraction thereof, of potential Mohave ground squirrel habitat on the project site. The traps shall be arranged in a 10 x 10 grid, with 35-meter spacing between traps.

5. Each sampling grid shall be trapped for a minimum five consecutive days, unless a Mohave ground squirrel is captured before the end of the five-day term on the grid or on another grid on the project site. If no Mohave ground squirrel is captured on a sampling grid on the project site in the first five-consecutive-day term, each sampling grid shall be sampled for a SECOND five-consecutive-day term. Trapping may be stopped before the end of the second term if a Mohave ground squirrel is captured on any sampling grid on the project site. If no Mohave ground squirrel is captured during the second five-consecutive-day term, each sampling grid shall be sampled for a THIRD five-consecutive -day term. The FIRST trapping term shall begin and be completed in the period of 15 March through 30 April. If a SECOND term is required, it shall begin at least two weeks after the end of the first term, but shall begin no earlier than 01 May, and shall be completed by 31 May. If a THIRD term is required, it shall begin at least two weeks after the end of the second term, but shall begin no earlier than 15 June, and shall be completed by 15 July. All trapping shall be conducted during appropriate weather conditions, avoiding periods of high wind, precipitation, and low temperatures (<50°F or 10°C).

6. For projects requiring two or more sampling grids, capture of a Mohave ground squirrel on any grid will establish presence of the species on the project site. Trapping may be stopped on all grids on the project site at that time. For linear projects, very large project sites, project sites characterized by fragmented or highly-heterogeneous habitats, or in other special circumstances, continued trapping may be necessary.

7. A maximum 100 traps shall be operated by each qualified biologist. Each trap shall be covered with a cardboard A-frame or equivalent non-metal shelter to provide shade. Trap and shelter orientation shall be on a north-south axis. All traps shall be opened within one hour of sunrise and may be closed beginning one hour before sunset. Traps shall be checked at least once every four hours to minimize heat stress to captured animals. When traps are open, temperature shall be measured at a location within the sampling grid, in the shade, and one foot (approx. 0.3 meters) above the ground at least once every hour. Traps shall be closed when the ambient air temperature at one foot above the ground in the shade exceeds 90°F (32°C). Trapping shall resume on the same day after the ambient temperature at one foot (approx. 0.3 meters) above the

ground in the shade falls to 90°F (32°C) and shall continue until one hour before sunset. Suggested baits are mixed grains, rolled oats, or bird seed, with a small amount of peanut butter.

8. A qualified biologist shall complete the Survey and Trapping Form, which is found on page 5 of these guidelines. This biologist, or the lead agency for the project, shall submit the completed form to the appropriate Department office (see page 4) with the biological report on the project site.

9. The Department may allow variation on these guidelines, with the advance written approval of the appropriate regional habitat conservation planning office (see page 4). Such variations could include biologically-appropriate modification of the trapping dates or changes in grid configuration that would enhance the probability of detecting Mohave ground squirrels. Any variation which concerns trapping or marking methods must be incorporated into the MOU or permit that authorizes the work.

10. If a survey conducted according to these guidelines results in no capture or observation of the Mohave ground squirrel on a project site, this is not necessarily evidence that the Mohave ground squirrel does not exist on the site or that the site is not actual or potential habitat of the species. However, in the circumstance of such a negative result, the Department will stipulate that the project site harbors no Mohave ground squirrels. This stipulation will expire one year from the ending date of the last trapping on the project site conducted according to these guidelines.

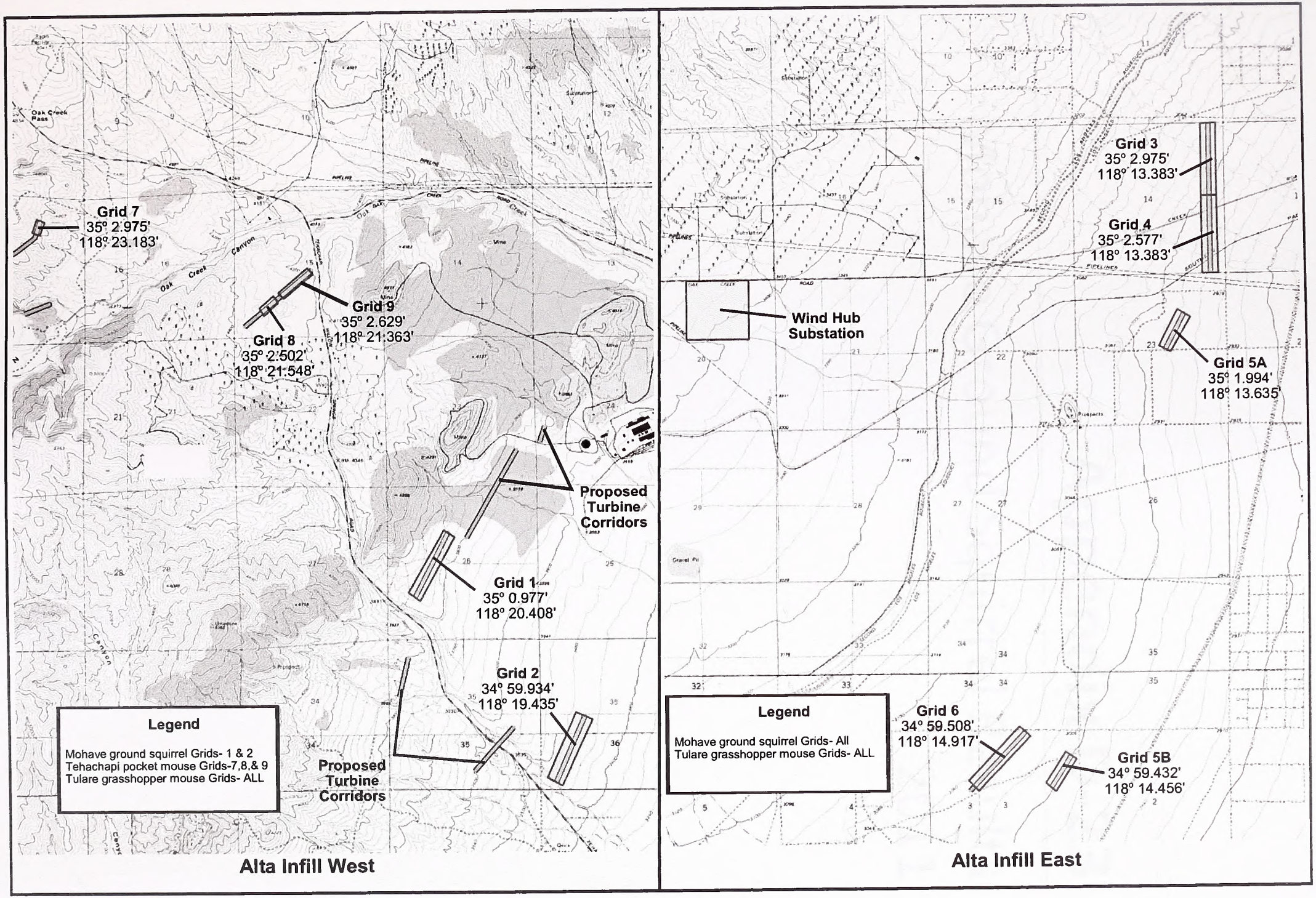


Figure 1. 2010 Alta Infill small mammal trapping grid locations.

Appendix D-23

Mohave Ground Squirrel Results 2011

Appendix D-23

Mohave Ground Squirrel Results 2021

SMALL MAMMAL TRAPPING RESULTS FOR THE Alta East WIND ENERGY PROJECT

KERN COUNTY, CALIFORNIA

SESSION 1

Prepared for:

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San Luis Obispo, CA 93405

May 2011

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1 Total Number of Captures per Species per Grid

Appendices

A California Department of Fish and Game Mohave Ground Trapping Protocol
B Daily results and habitat description of grids

1 Introduction

Alta Windpower Development, LLC proposes to construct the Alta East Wind Project (project) in the Tehachapi region of southern California. Portions of the project would be located on land managed by the U.S. Bureau of Land Management and privately owned land under the jurisdiction of Kern County. William Vanherweg was contracted by CH2M HILL Engineers, Inc. (CH2M HILL) to conduct surveys for Mohave ground squirrel (*Xerospermophilus mohavensis*) and other special-status small mammals.

1.1 Project Description

The proposed development is a wind energy facility with a nameplate capacity rating of approximately 300 megawatts of wind turbine generation and includes ancillary facilities and supporting infrastructure. Up to 120 wind turbine generators would be installed. The project includes repowering a historical wind power project site north of State Route 58 on BLM lands and infilling existing wind facilities south of SR 58 in the area of Cameron Ridge. The project is located 2 miles west of the intersection of Highway 58 and Highway 14 in the Mojave Desert (Figure 1) and is within the Tehachapi Wind Resource Area (WRA) of eastern Kern County.

2 Environmental Setting

The project area falls within the Mojave Basin and Range ecoregion. This ecoregion is characterized by scattered, generally low-elevation mountains. Much of the land in this ecoregion is federally owned. Some areas have experienced severe wind and water erosion problems have been linked to extensive off highway vehicle (OHV) use, overgrazing and fire (USEPA, 2009). The climate in this ecoregion consists of the Mediterranean climate of hot, dry summers and moist, cool winters.

The elevation of the site is approximately 3,000 to 4,400 feet above sea level.

2.1 Current Land Use

The project site exhibits light to heavy disturbance. Human disturbance influencing the project area include: OHV use, urban/industrial development, scattered trash, and State highway 58.

2.2 Vegetation

The project site is predominantly creosote bush (*Larrea tridentata*) scrub habitat with some Joshua tree woodland and mixed Mojave scrub.

Figure 1





LEGEND

Project Area

N

0 7.5 15
Miles

FIGURE 1
Project Vicinity Map
Alta East Wind Project
Alta Wind Energy Center Project

CH2MHILL

DEN \\COBRA\PROJ\TERRAGENPOWER\TERRAGEN_ALTA_EAST\GIS\MAPFILES\BIOLOGICAL_ASSESSMENT\BA_FIG1_PROJECTVICINITY.MXD SSAVAGE1 6/2/2011 3:22:04 PM

3 Special Status Mammals Natural History

A California Natural Diversity Database (CNDDB) search was conducted for the project area and a ten mile buffer May 27, 2011. The following special-status small mammals were present in the CNDDB search area: Mohave ground squirrel, San Joaquin pocket mouse (*Perognathus inornatus*), and Tehachapi pocket mouse (*Perognathus alticola*), and Tulare grasshopper mouse (*Onychomys torridus tularensis)*. Based on a review of species' ranges two subspecies that appear in the database search, Tulare grasshopper mouse does not occur in the project area (Hall 1981). Tulare grasshopper mice are known only from west of the project site in the San Joaquin Valley and the Carrizo Plain. The subspecies that occurs in the project area is *O. t. pulcher* and is not considered a special status taxon (Hall 1981). Therefore, Tulare grasshopper mouse was not included in this investigation. This report addresses trapping for Mohave ground squirrel, Mojave pocket mouse, and Tehachapi pocket mouse.

3.1 Mohave Ground Squirrel

Mohave ground squirrels are approximately 8.5 - 9 inches in length and can be found in desert scrub habitats. Activity periods for this species vary and little is known about their reproduction (Ingles 1979). Their diet consists of seeds, vegetative parts of desert plants including fruits of the Joshua tree. Due to the aridity and high temperatures of its environment they are a diurnal species spending up to seven months underground. The Mohave ground squirrel is listed as threatened by CDFG. The species is currently being considered for listing under the federal Endangered Species Act as endangered (75 Fed. Reg. 22063).

3.2 San Joaquin Pocket Mouse

The San Joaquin pocket mouse is relatively small with adults weighing 12-18 grams. Their pelage is light brown to cinnamon with white bellies. They are nocturnal and are rarely active when temperatures drop below 50° F. They mainly eat small seeds of grasses and forbs but have been known to eat cutworms (Best 1993). The species is generally associated with annual grassland and oak habitat (Laabs and Allaback 2002), but has also been captured in all desert scrub habitats, Joshua tree woodland, juniper woodland, and other higher elevation scrub habitats (Vanherweg personal experience). The San Joaquin pocket mouse is a state species of special concern, which does not confer any legal protections, but rather calls attention to a species that may be listed at some time in the future. Recent work by David Laabs and Mark Allaback indicate that the San Joaquin pocket mice found in the Tehachapi Mountains and western Mojave Desert, which includes the project area, are most likely a new taxon, the Mohave pocket mouse (*Perognathus* sp.).

3.3 Tehachapi Pocket Mouse

The Tehachapi pocket mouse is medium-sized for the genus, averaging (5.9 and 6.5 in.) in total length and 16-28 grams for females and males, respectively (Best, 1994). Little is known about the ecology of the Tehachapi pocket mouse. Other members of the genus are nocturnal granivores, foraging primarily on seeds of grasses, forbs and annuals, but also on leafy plant material and insects (Verts and Kirkland, 1988). Most other members of the genus exhibit seasonal hibernation (Verts and Kirkland, 1988). The Tehachapi pocket mouse occupies native and non-native grasslands, Joshua tree woodland, pinyon-juniper woodland, yellow pine woodland and oak savannah (Williams et al., 1993). It constructs burrows in loose, sandy soils. The Tehachapi pocket mouse is a state species of special concern, which does not confer any legal protections, but rather calls attention to a species that may be listed at some time in the future.

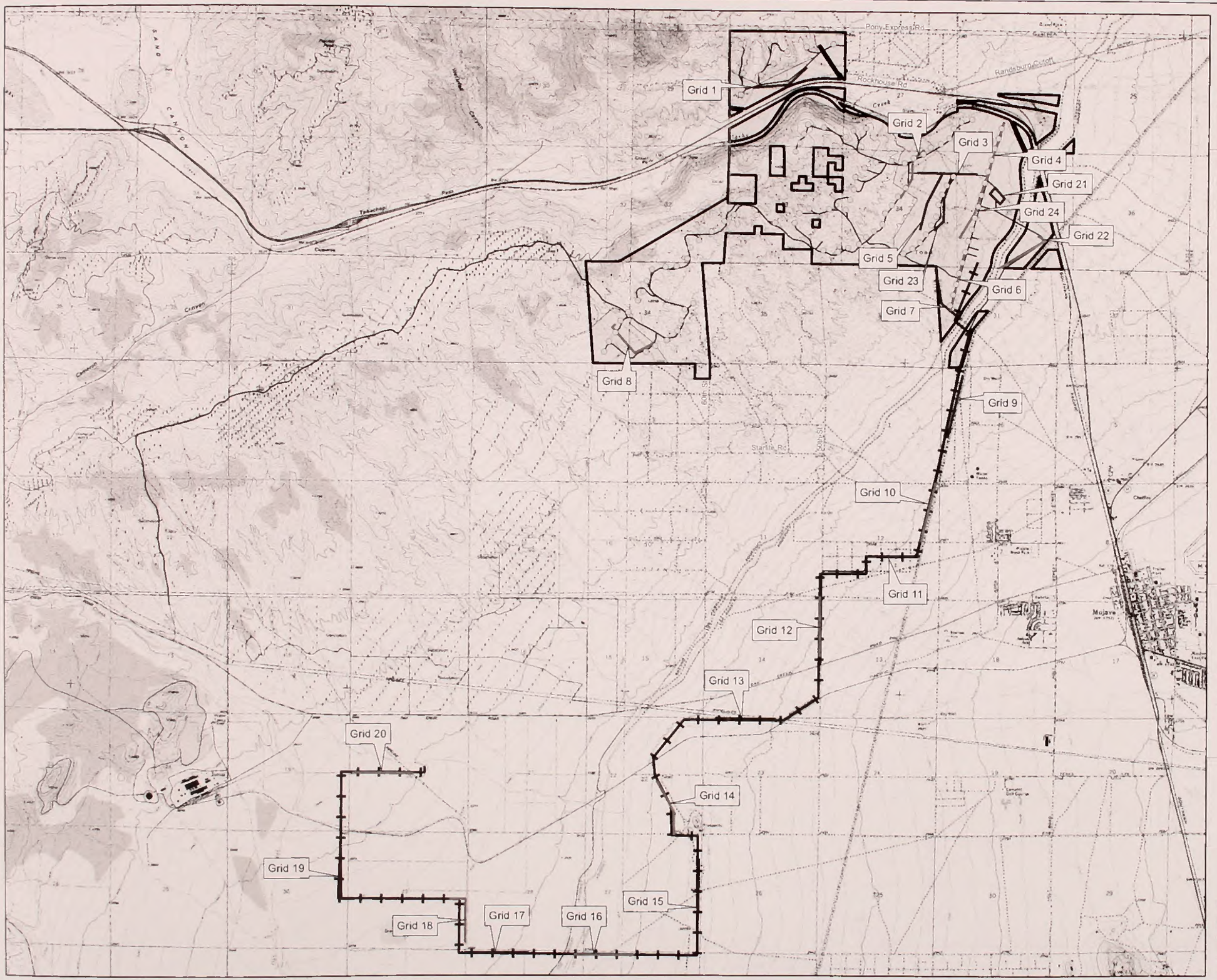
4 Methods

4.1 Mohave Ground Squirrel

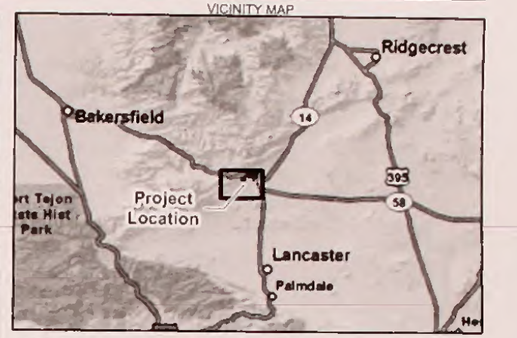
Surveys for Mohave ground squirrels were consistent with the survey guidelines issued by CDFG (CDFG, 2003)(Appendix A). An evaluation of habitat suitability was conducted in June 2010 (Vanherweg 2010). In spring 2011, a map displaying suitable habitat and proposed trapping grids was submitted to Justin Sloan at CDFG for review. Twenty-four trapping grids were established along linear portions of the project including proposed turbine strings, transmission lines, access roads, and at a laydown area (Figure 2). The trapping grids along the proposed linear developments were arranged in 4 traps wide by 25 traps long configurations, the laydown area had a 10 traps wide by 10 traps long configuration as per CDFG protocol. The first session of trapping was conducted between 15 March and 30 April. The second and third sessions will be conducted between 1 May and 15 July per the CDFG protocol. The results of all three trapping sessions will reported in summer 2011.

4.2 Other Special-status Small Mammals

Nocturnal trapping for Tehachapi pocket mouse and Mojave pocket mouse in appropriate habitats of the proposed project area (Figure 2) will be conducted in July and August 2011.



VICINITY MAP



LEGEND

- Proposed Wind Turbine Layout
- Proposed Access Roads
- Transmission Line
- Mohave Ground Squirrel Potential Habitat Area within the Project Boundary

Mohave Ground Squirrel Trapping Grid Line

- Grids 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21 & 23
- Grids 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22 & 24
- Alta East Wind Energy Project Area

Notes:
Trapping Grid lines were grouped by color for visual clarity only and do not represent any differences in method or approach.

N

0 2,000 4,000
Feet

FIGURE 2
Mohave Ground Squirrel Trapping Grids
Alta East Wind Energy Project
Kern County, California

CH2MHILL

5 Results

No Mohave ground squirrels were captured during the first session of trapping. Trapping for the other special status species have not been completed. Table 1 contains the general results of the Mojave ground squirrel trapping survey to date. Habitat descriptions of each grid, daily weather conditions, and results of our trapping efforts can be found in Appendix B.

Table 1. Total Number of Captures per Species per Grid.

Total Captures Per Grid Per Species			
Grid	Mohave ground squirrel	White-tailed antelope squirrel	California Ground squirrel
1	0	10	0
2	0	25	0
3	0	28	0
4	0	55	0
5	0	22	0
6	0	36	0
7	0	25	0
8	0	1	0
9	0	23	0
10	0	33	0
11	0	22	0
12	0	15	0
13	0	5	0
14	0	41	0

15	0	46	0
16	0	68	0
17	0	52	0
18	0	17	0
19	0	22	0
20	0	30	5
21	0	21	0
22	0	33	0
23	0	16	0
24	0	50	4

6 References

Bailey, V., and C.C. Sperry. 1929. Life history and habits of the grasshopper mice, genus *Onychomys*. U.S. Dept. Agric. Tech. Bull. 145:1-19.

Best, T.L. 1993. *Perognathus inornatus*. Mammalian Species 450:1-5. The American Society of Mammalogists.

Best, T.L. 1994. *Perognathus alticolus*. Mammalian Species 463:1-4. California Natural Diversity Data Base (CNDDB).

Bolster, B.C. Ed. 1998. Terrestrial Mammal Species of Special Concern in California.

Burt, W. B. and R. P. Grossenheimer. 1976. A field guide to the mammals. Houghton Mifflin Co. Boston, MA 289 pp.

California Department of Fish and Game. 2003. CDFG unpubl. guidelines. Mohave Ground Squirrel Survey Guidelines.

California Department of Fish and Game. 2010. California Natural Diversity Data Base Records.

Hall, E. R.1981. The Mammals of North America. 2d ed. 2 vols. New York: John Wiley & Sons.

Horner, B.E., J.M. Taylor, and H.A. Padykula. 1964. Food habits and gastric morphology of the grasshopper mouse. J. Mammal. 45:513-535.

Ingles, Lloyd G. 1979. Mammals of the Pacific States. Stanford University Press, Stanford, CA. 506pp.

Laabs, D.M.and M.L. Allaback 2002. *In* Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands. Vollmar Consulting, Berkeley, CA. in Vollmar, J.E. (Ed.). pp. 315-336.

McCarty, R. 1975. *Onychomys torridus*. Mammal. Species 59:1-5.

Vanherweg, W. 2010. Sun Creek Sensitive Mammals Habitat Suitability Survey. Memo. Submitted to CH2M HILL. June 17.

Verts, B.J, and G.L. Kirkland. 1988. *Perognathus parvus*. Mammalian Species 318: 1-8.

United States Environmental Protection Agency (USEPA). 2009. "Primary Distinguishing Characteristics of Level III Ecoregions of the Continental United States." [online]: http://www.epa.gov/wed/pages/ecoregions/level_iii.htm.

Williams, D.F., H.H. Genoways, and J.K. Braun. 1993. Taxonomy. pp. 36-196. *In:* H.H. Genoways and J.H. Brown (eds.), Biology of the Heteromyidae. Special Publication, The American Society of Mammalogists.

Appendix A – CDFG Mohave Ground Squirrel Trapping Protocol

CALIFORNIA DEPARTMENT OF FISH AND GAME
MOHAVE GROUND SQUIRREL SURVEY GUIDELINES
(January 2003)

1. Visual surveys to determine Mohave ground squirrel activity and habitat quality shall be undertaken the period of 15 March through 15 April. All potential habitat on a project site shall be visually surveyed during daylight hours by a biologist who can readily identify the Mohave ground squirrel and the white-tailed antelope squirrel (*Ammospermophilus leucurus*).

2. If visual surveys do not reveal presence of the Mohave ground squirrel on the project site, standard small-mammal trapping grids shall be established in potential Mohave ground squirrel habitat. The number of grids will depend on the amount of potential habitat on the project site, as determined by the guidelines presented in paragraphs 4 and 5 of these guidelines.

3. For linear projects (for example, highways, pipelines, or electric transmission lines), each sampling grid shall consist of 100 Sherman live-traps (or equivalent; the minimum length of any trap is 12 inches) arranged in a rectangular pattern, 4 traps wide by 25 traps long, with traps spaced 35 meters apart along each of the four trap lines. At a minimum, one sampling grid of this type shall be established in each linear mile, or fraction thereof, of potential Mohave ground squirrel habitat along the project corridor.

4. For all other types of projects, one sampling grid consisting of 100 Sherman live-traps (or equivalent; the minimum length of any trap is 12 inches) shall be established for each 80 acres, or fraction thereof, of potential Mohave ground squirrel habitat on the project site. The traps shall be arranged in a 10 x 10 grid, with 35-meter spacing between traps.

5. Each sampling grid shall be trapped for a minimum five consecutive days, unless a Mohave ground squirrel is captured before the end of the five-day term on the grid or on another grid on the project site. If no Mohave ground squirrel is captured on a sampling grid on the project site in the first five-consecutive-day term, each sampling grid shall be sampled for a SECOND five-consecutive-day term. Trapping may be stopped before the end of the second term if a Mohave ground squirrel is captured on any sampling grid on the project site. If no Mohave ground squirrel is captured during the second five-consecutive-day term, each sampling grid shall be sampled for a THIRD five-consecutive -day term. The FIRST trapping term shall begin and be completed in the period of 15 March through 30 April. If a SECOND term is required, it shall begin at least two weeks after the end of the first term, but shall begin no earlier than 01 May, and shall be completed by 31 May. If a THIRD term is required, it shall begin at least two weeks after the end of the second term, but shall begin no earlier than 15 June, and shall be completed by 15 July. All trapping shall be conducted during appropriate weather conditions, avoiding periods of high wind, precipitation, and low temperatures (<50°F or 10°C).

6. For projects requiring two or more sampling grids, capture of a Mohave ground squirrel on any grid will establish presence of the species on the project site. Trapping may be stopped on all grids on the project site at that time. For linear projects, very large project sites, project sites characterized by fragmented or highly-

heterogeneous habitats, or in other special circumstances, continued trapping may be necessary.

7. A maximum 100 traps shall be operated by each qualified biologist. Each trap shall be covered with a cardboard A-frame or equivalent non-metal shelter to provide shade. Trap and shelter orientation shall be on a north-south axis. All traps shall be opened within one hour of sunrise and may be closed beginning one hour before sunset. Traps shall be checked at least once every four hours to minimize heat stress to captured animals. When traps are open, temperature shall be measured at a location within the sampling grid, in the shade, and one foot (approx. 0.3 meters) above the ground at least once every hour. Traps shall be closed when the ambient air temperature at one foot above the ground in the shade exceeds 90°F (32°C). Trapping shall resume on the same day after the ambient temperature at one foot (approx. 0.3 meters) above the ground in the shade falls to 90°F (32°C) and shall continue until one hour before sunset. Suggested baits are mixed grains, rolled oats, or bird seed, with a small amount of peanut butter.

8. A qualified biologist shall complete the Survey and Trapping Form, which is found on page 5 of these guidelines. This biologist, or the lead agency for the project, shall submit the completed form to the appropriate Department office (see page 4) with the biological report on the project site.

9. The Department may allow variation on these guidelines, with the advance written approval of the appropriate regional habitat conservation planning office (see page 4). Such variations could include biologically-appropriate modification of the trapping dates or changes in grid configuration that would enhance the probability of detecting Mohave ground squirrels. Any variation which concerns trapping or marking methods must be incorporated into the MOU or permit that authorizes the work.

10. If a survey conducted according to these guidelines results in no capture or observation of the Mohave ground squirrel on a project site, this is not necessarily evidence that the Mohave ground squirrel does not exist on the site or that the site is not actual or potential habitat of the species. However, in the circumstance of such a negative result, the Department will stipulate that the project site harbors no Mohave ground squirrels. This stipulation will expire one year from the ending date of the last trapping on the project site conducted according to these guidelines.

Appendix B – Trapping Grid Habitat Descriptions, Daily Weather Conditions, and Trapping Results

Grid 1

Visual Surveys were conducted by: Greg Warrick

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS –*Bromus tectorum, Bromus madritensis., Erodium cicutarium, Amsinckia sp.*

DOMINANT PERENNIALS-, *Yucca brevifolia, Ephedra trifurca, Eriogonum fasciculatum, Ericameria* sp., Achnatherum sp., *Poa* sp., *Hymenoclea salsola,*

OTHER PERENNIALS- Juniperus californicus, *Tetradymia spinosa, Encelia farinosa, Grayia spinosa, Krascheninnikovia lanata, Lycium andersonii, Yucca sp., Opuntia* spp., *Lepidospartum squamatum, Larrea tridentata.*

Elevation – Approx. 3,500 to 3,600 ft **Slope –** 0% - 5%

Trapping conducted by: Greg Warrick

Grid 1
First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS*	MGS*	AM	PM	AM	PM
4/11/2011	0638	42	0	0	90%	30%	5-10	10-15
	1514	65						
4/12/2011	0710	52	4	0	40%	CLEAR	10-15	10-15
	1500	71						
4/13/2011	0701	48	2	0	10%	20%	10-15	25-30
	1507	46						
4/14/2011	0639	42	1	0	CLEAR	5%	5-10	5-10
	1439	67						
4/15/2011	0643	49	3	0	5%	1%	0-5	5-10
	1457	72						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grids 2-5

Visual Surveys were conducted by: William Vanherweg

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS –*Bromus tectorum, Bromus madritensis., Erodium cicutarium, Amsinkia sp.*

DOMINANT PERENNIALS-, *Larrea tridentata Yucca brevifolia, Ephedra trifurca, Eriogonum fasciculatum, Ericameria* sp., Achnatherum sp., *Poa* sp., *Hymenoclea salsola,*

OTHER PERENNIALS- Juniperus californicus, *Tetradymia spinosa, Encelia farinosa, Grayia spinosa, Krascheninnikovia lanata, Lycium andersonii, Yucca* sp., *Opuntia* sp., *Lepidospartum squamatum.*

Elevation – Approx. 3,200 to 3,300 ft **Slope –** 0% - 5%

Trapping conducted by: William and Paul Vanherweg

Grid 2 First session

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
3/31/2011	0700	61	4	0	0%	0%	0	0
	1500	85						
4/1/2011	0700	59	7	0	0%	0%	0	0-5
	1530	86						
4/2/2011	0700	61	7	0	30%	30%	0-5	5-10
	0845	73						
4/3/2011	0700	51.7	2	0	30%	0%	0-5	5-10
	1600	65						
4/4/2011	0700	48	5	0	0%	0%	0-5	0-5
	1530	72						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grid 3 First session

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
3/31/2011	0700	61	10	0	0%	0%	0	0
	1500	85						
4/1/2011	0700	59	8	0	0%	0%	0	0-5
	1530	86						
4/2/2011	0700	61	4	0	30%	30%	0-5	5-10
	0845	73						
4/3/2011	0700	51.7	3	0	30%	0%	0-5	5-10
	1600	65						
4/4/2011	0700	48	3	0	0%	0%	0-5	0-5
	1530	72						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grid 4 First session

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
3/26/2011	0700	42	0	0	50%	100%	5-10	10-20
	1500	52						
3/27/2011	0700	48	16	0	50%	5%	0-5	0-5
	1530	60						
3/28/2011	0700	51	13	0	5%	0%	0-5	0-5
	0845	62						
3/29/2011	0700	45	14	0	5%	60%	0-5	5-10
	1600	74						
3/30/2011	0700	47	12	0	10%	50%	0-5	0-5
	1530	79						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grid 5 First session

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
4/5/2011	0700	58	9	0	0%	0%	0-5	5-10
	1500	77						
4/6/2011	0700	52	2	0	80%	0%	5-10	5-10
	1530	69						
4/7/2011	0700	43	4	0	0%	100%	10-15	15-20
	1400	53						
4/8/2011	0830	40	4	0	0%	100%	5-10	5-10
	1200	45						
4/9/2011	0830	40	3	0	0%	10%	0-5	15-20
	1500	52						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grids 6 and7

Visual Surveys were conducted by: Gin Ingrahm

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS –*Bromus tectorum, Bromus madritensis., Erodium cicutarium, Amsinkia sp.*

DOMINANT PERENNIALS-, *Larrea tridentate, Yucca brevifolia, Ephedra trifurca, Eriogonum fasciculatum, Ericameria* sp., Achnatherum sp., *Poa* sp., *Hymenoclea salsola,*

OTHER PERENNIALS-, *Tetradymia spinosa, Encelia farinosa, Grayia spinosa, Krascheninnikovia lanata, Lycium andersonii, Yucca* sp., *Opuntia* sp., *Lepidospartum squamatum.*

Elevation – Approx. 3,000 to 3,200 ft **Slope** – 0% - 5%

Trapping conducted by: Gin Ingrahm

First Term Grid #6

DATE	TIME	TEMP F air/gnd	CAPTURES		Cloud Cover		Wind speed (Mi/hr)/Dir.	
			AGS	MGS	AM	PM	AM	PM
4/11/2011	630	41/45	10	0	95%	45%	0-5 w	5-10 w
	1530	67/77						
4/12/2011	645	52/56	7	0	20%	0%	5-10 w	10-12 w
	1545	69/73						
4/13/2011	650	47/50	4	0	10%	30%	10-15 nw	15-20 nw
	1550	55/63						
4/14/2011	650	45/45	9	0	5%	5%	0-5 var	5-10 w
	1550	68/72						
4/15/2011	640	43/50	6	0	5%	0%	0-5 se	5-10 w
	1550	75/70						
	1845	53.1						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

First Term Grid #7

DATE	TIME	TEMP F air/gnd	CAPTURES		Cloud Cover		Wind speed (Mi/hr)/Dir.	
			AGS	MGS	AM	PM	AM	PM
4/18/2011	630	55/60	8	0	70%	60%	5-10 w	8-12 w
	1515	70/75						
4/19/2011	620	55/58	7	0	60%	15%	5-10 w	15-18 w
	1530	73/82						
4/20/2011	620	55/56	6	0	30%	40%	5-10 w	20+
	1530	74/77						
4/21/2011	620	54/59	1	0	35%	25%	10-15 w	15-20 w
	1530	67/76						
4/22/2011	620	51/54	3	0	0%	50%	0-5 w	10-15 w
	1600	68/75						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grid 8

Visual Surveys were conducted by: Bill Vanherweg

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS –*Bromus tectorum, Bromus madritensis., Erodium cicutarium, Amsinkia sp.*

DOMINANT PERENNIALS *Ephedra trifurca, Eriogonum fasciculatum, Ericameria sp.,* Achnatherum sp., *Poa* sp., *Hymenoclea salsola,*

OTHER PERENNIALS-, *Tetradymia spinosa, Encelia farinosa, Krascheninnikovia lanata, Lycium andersonii, Yucca* sp., *Opuntia* sp., *Lepidospartum squamatum.*

Elevation – Approx. 3,600 ft **Slope** – 0% - 5%

Trapping conducted by: Alex Brown

Grid 8 First session

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
4/16/2011	0630	52.2	0	0	15%	30%	10-15	30+
	1000	54.2						
4/17/2011	0625	53.4	0	0	20%	25%	15-20	30+
	0830	54.6						
4/18/2011	0635	52.1	0	0	25%	60%	15-20	30+
	0845	50.7						
4/19/2011	0640	51.7	1	0	80%	20%	10-15	30+
	1030	62.2						
4/20/2011	0630	48.6	0	0	40%	30%	20-25	30+
	1845	53.1						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grids 9-12

Visual Surveys were conducted by: Gin Ingrahm

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS –*Bromus tectorum, Bromus madritensis., Erodium cicutarium, Amsinkia* sp .

DOMINANT PERENNIALS-, *Larrea tridentate, Yucca brevifolia, Ephedra trifurca, Eriogonum fasciculatum, Ericameria* sp., Achnatherum sp., *Poa* sp., *Hymenoclea salsola,*

OTHER PERENNIALS-, *Tetradymia spinosa, Encelia farinosa, Grayia spinosa, Krascheninnikovia lanata, Lycium andersonii, Yucca* sp., *Opuntia* spp., *Lepidospartum squamatum.*

Elevation – Approx. 3,000 to 3,200 ft **Slope –** 0% - 5%

Trapping conducted by: Gin Ingrahm

First Term Grid #9

DATE	TIME	TEMP F air/gnd	CAPTURES		Cloud Cover		Wind speed (Mi/hr)/Dir.	
			AGS	MGS	AM	PM	AM	PM
4/4/2011	700	42/42	5	0	0%	0%	5-10 n	0-3 w
	1530	72/73						
4/5/2011	700	52/50	8	0	35%	10%	0-5 sw	15-20 sw
	1550	75/77						
4/6/2011	645	50/53	6	0	100%	35%	13-15 w	18-22 w
	1600	68/77						
4/7/2011	645	41/50	2	0	15%	100%	20-25 nw	18-20 nw
	1445	50/57						
4/8/2011	950	43/42	0	0	5%	85%	5-10 w	10-12 sw
	1445	50/66						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

First Term Grid #10

DATE	TIME	TEMP F air/gnd	CAPTURES		Cloud Cover		Wind speed (Mi/hr)/Dir.	
			AGS	MGS	AM	PM	AM	PM
3/28/2011	645	47/46	3	0	35%	15%	0-5 w	15-20 w
	1510	58/66						
3/29/2011	700	48/46	8	0	45%	80%	0-2 n	18-20 sw
	1500	66/68						
3/30/2011	650	44/46	7	0	25%	80%	0-4 nw	0-2 var
	1530	78/66						
3/31/2011	650	54/52	7	0	5%	5%	0-4 nw	0-5 e
	1515	84/70						
4/1/2011	645	55/56	5	0	0%	0%	0-5 nw	5-8 nw
	1600	88/75						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

First Term Grid #11

DATE	TIME	TEMP F air/gnd	CAPTURES		Cloud Cover		Wind speed (Mi/hr)/Dir.	
			AGS	MGS	AM	PM	AM	PM
3/21/2011	1130	50/50	5	0	85%	45%	5-10 w	5-10 w
	1600	53/55						
3/22/2011	830	43/40	4	0	30%	20%	8-10 nw	5-10 w
	1630	56/59						
3/23/2011	730	40/43	2	0	90%	100%	0-5 nw	0-2 w
	1230	56/60						
3/24/2011	745	40/40	5	0	10%	95%	5-8 nw	10-15 nw
	1615	50/55						
3/25/2011	720	40/41	6	0	75%	80%	15-20 nw	15-20 nw
	1100	47/47						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

First Term Grid #12								
DATE	TIME	TEMP F air/gnd	CAPTURES		Cloud Cover		Wind speed (Mi/hr)/Dir.	
			AGS	MGS	AM	PM	AM	PM
3/16/2011	1045	50/51	0	0	0%	0%	5-10 w	20-25 nw
	1400	63/61						
3/17/2011	1045	50/51	4	0	100%	50%	10 nw	20 nw
	1530	65/56						
3/18/2011	945	59/48	5	0	0%	90%	0-5 w	8-10 w
	1445	69/69						
3/19/2011	915	50/47	6	0	95%	100%	5 nw	8-10 nw
	1300	54/57						
3/20/2011	1400	49/49	0	0	100%	100%	10-15 w	10-15 w
	1600	50/52						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grids 13-18

Visual Surveys were conducted by: Bill Vanherweg

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS –*Bromus tectorum, Bromus madritensis., Erodium cicutarium, Amsinkia sp.*

DOMINANT PERENNIALS-, *Larrea tridentate, Yucca brevifolia, Ephedra trifurca, Eriogonum fasciculatum, Ericameria sp.,* Achnatherum sp., *Poa sp., Hymenoclea salsola,*

OTHER PERENNIALS-, *Tetradymia spinosa, Encelia farinosa, Grayia spinosa, Krascheninnikovia lanata, Lycium andersonii, Yucca sp., Opuntia sp., Lepidospartum squamatum.*

Elevation – Approx. 3,000 to 3,200 ft **Slope –** 0% - 5%

Trapping conducted by: Chris Haley

Grid 13 First Term

	TIME	TEMP °F air	CAPTURES		Cloud Cover(%)		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
4/11/2011	0800	50	1	0	60	70	1	4
	1400	69						
4/12/2011	0830	51	2	0	5	1	9	8
	1330	67						
4/13/2011	1100	47	1	0	30	30	25	27
	1230	50						
4/14/2011	0900	50	0	0	1	35	1	4
	1400	66						
4/15/2011	0830	51	1	0	15	15	10	13
	1500	73						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grid 14
First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS*	CAPTURES MGS*	Cloud Cover (%) AM	Cloud Cover (%) PM	Wind speed (Mi/hr) AM	Wind speed (Mi/hr) PM
3/30/2011	0800	50	8	0	30	60	4	7
	1500	88						
3/31/2011	0715	52	9	0	5	5	5	3
	1500	83						
4/1/2011	0715	54	11	0	CLEAR	CLEAR	1	6
	1500	87						
4/2/2011	0700	52	6	0	60	40	7	10
	1430	77						
4/3/2011	0645	49	7	0	65	10	12	10
	1100	61						

Grid 15
First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS	CAPTURES MGS	Cloud Cover(%1 AM	Cloud Cover(%1 PM	Wind speed (Mi/hr) AM	Wind speed (Mi/hr) PM
4/4/2011	0900	53	10	0	CLEAR	5	2	3
	1400	70						
4/5/2011	0800	51	19	0	20	25	1	8
	1500	75						
4/6/2011	0830	51	16	0	50	35	4	9
	1500	66						
4/7/2011	1000	49	1	0	25	90	5	6
	1230	50						
4/8/2011	1130	47	0	0	30	80	6	10
	1545	54						

Grid 16
First Sampling Term

	TIME	TEMP °F air			Cloud Cover(%)		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
4/26/2011	0930	50	6	0	50	2	13	10
	1500	69						
4/27/2011	0700	51	22	0	2	15	4	10
	1500	77						
4/28/2011	0630	52	22	0	30	20	13	8
	1500	68						
4/29/2011	1045	50	9	0	0	0	28	13
	1400	66						
4/30/2011	0930	49	9	0	0	0	14	10
	1500	68						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grid 17
First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover (%)		Wind speed (Mi/hr)	
			AGS*	MGS*	AM	PM	AM	PM
4/21/2011	0645	50	8	0	40	40	20	14
	1400	70						
4/22/2011	0715	49	13	0	5	15	20	10
	1200	73						
4/23/2011	0700	50	11	0	20	20	10	10
	1500	67						
4/24/2011	0730	50	9	0	30	50	10	12
	1300	68						
4/25/2011	0730	50	11	0	70	50	10	8
	1400	71						

Grid 18
First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover(%)		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
4/23/2011	0700	50	1	0	20	20	10	10
	1500	67						
4/24/2011	0730	50	2	0	30	50	10	12
	1300	68						
4/25/2011	0730	50	3	0	70	50	10	8
	1400	71						
4/26/2011	0930	50	5	0	50	2	13	10
	1500	63						
4/27/2011	0700	51	6	0	2	15	4	10
	1500	77						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grid 19

Visual Surveys were conducted by: Barbara M. Leitner

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS – *Erodium cicutarium, Amsinckia tessellata, Schismus sp., Bromus tectorum, Bromus madritensis*

DOMINANT PERENNIALS- *Larrea tridentata*

OTHER PERENNIALS- *Hymenoclea salsola, Acamptopappus sphaerocephalus*, a few *Lycium* spp., *Ephedra californica*

Elevation – Approx. 3,360 ft **Slope – 0=2** %

Trapping conducted by: Barbara M. Leitner

Grid 19
First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS*	MGS*	AM	PM	AM	PM
3/21/2011	1000	42	1	0	15 %	35%	0-8	10-15
	1812	48						
3/22/2011	0840	44	7	0	3%	5%	4-6	2-4
	1832	56						
3/23/2011	0650	48	9	0	35%	100%	0-1	0-2
	1630	67						
3/24/2011	0745	40	3	0	5%	85%	0-1	5-8
	1844	53						
3/25/2011	0710	46	2	0	10%	10%	2	11
	1815	55						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grid 20

Visual Surveys were conducted by: Barbara M. Leitner

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS – *Erodium cicutarium, Amsinckia tessellata, Schismus sp., Bromus tectorum, Bromus madritensis*

DOMINANT PERENNIALS- *Larrea tridentata*

OTHER PERENNIALS-Diverse assemblage of *Lycium cooperi, L. andersonii, Yucca brevifolia, Krascheninnikovia lanata, Acamptopappus sphaerocephalus, Senecio species.*

Elevation – Approx. 3,450 ft **Slope – 0-2** %

Trapping conducted by: Barbara M. Leitner

Grid 20
First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS*	MGS*	AM	PM	AM	PM
3/27/2011	0815	45	2	0	5 %	2%	0-5	5-8
	1900	56						
3/28/2011	0655	45	3	0	3%	3%	5-12	7-8
	1900	60						
3/29/2011	0700	46	4	0	20%	30%	0-5	10
	1900	66						
3/30/2011	0700	51	7	0	30%	30%	0-1	0-1
	1845	82						
3/31/2011	0640	62	14	0	CLEAR	1%	0-1	0-1
	1800	80						

Other species captured: California ground squirrel (5)

---

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grids 21-24

Visual Surveys were conducted by: William Vanherweg

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS –*Bromus tectorum, Bromus madritensis., Erodium cicutarium, Amsinkia sp.*

DOMINANT PERENNIALS-, *Larrea tridentata Yucca brevifolia, Ephedra trifurca, Eriogonum fasciculatum, Ericameria sp.,* Achnatherum sp., *Poa sp., Hymenoclea salsola,*

OTHER PERENNIALS- Juniperus californicus, *Tetradymia spinosa, Encelia farinosa, Grayia spinosa, Krascheninnikovia lanata, Lycium andersonii, Yucca sp., Opuntia sp., Lepidospartum squamatum,.*

Elevation – Approx. 3,200 to 3,300 ft **Slope** – 0% - 5%

Trapping conducted by: William and Paul Vanherweg

Grid 21 First session

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
3/20/2011	0700	40	3	0	20%	20%	0-5	5-10
	1600	62						
3/21/2011	0700	41	7	0	30%	5%	0-5	0-5
	1700	61						
4/22/2011	0700	46	3	0	80%	100%	0-5	5-10
	1500	53						
4/23/2011	0800	40	3	0	50%	80%	5-10	10-15
	1530	53						
4/24/2011	0700	43	5	0	20%	20%	10-15	10-15
	1500	54						

Grid 22 First session

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
4/10/2011	0700	47	5	0	0%	0%	0-5	0-5
	1600	66						
4/11/2011	0700	48	9	0	100%	90%	0-5	10-15
	1700	66						
4/12/2011	0700	50	7	0	5%	0%	10-15	0-5
	1500	60						
4/13/2011	0800	48	6	0	5%	15%	0-5	25-30
	1530	58						
4/14/2011	0700	45	6	0	0%	80%	0-5	10-15
	1500	66						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grid 23 First session

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
4/5/2011	0700	58	8	0	0%	0%	0-5	5-10
	1500	77						
4/6/2011	0700	52	2	0	80%	0%	5-10	5-10
	1530	69						
4/7/2011	0700	43	3	0	0%	100%	10-15	15-20
	1400	53						
4/8/2011	0830	40	1	0	0%	100%	5-10	5-10
	1200	45						
4/9/2011	0830	40	2	0	0%	10%	0-5	15-20
	1500	52						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grid 24 First session

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
4/10/2011	0700	47	12	0	0%	0%	0-5	0-5
	1600	66	1 cags					
4/11/2011	0700	48	13	0	100%	90%	0-5	10-15
	1700	66	1cags					
4/12/2011	0700	50	14	0	5%	0%	10-15	0-5
	1500	60	1 cags					
4/13/2011	0800	48	5	0	5%	15%	0-5	25-30
	1530	58	1cags					
4/14/2011	0700	45	6	0	0%	80%	0-5	10-15
	1500	66						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel, cags= California ground squirrel

Appendix D-24

Botanical Inventory Report 2010

Botanical Inventory Report
for the
Sun Creek Wind Project

Kern County, CA

Prepared by:

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Prepared for:

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155 Grand Avenue
Oakland, CA 94612
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Contact: Ms. Bridget Canty

21 September 2010

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Botanical Inventory Report
for the
Sun Creek Wind Project

Kern County, CA

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I. EXECUTIVE SUMMARY

Botanical surveys of the approximately 1,424 ac Sun Creek Wind Project botanical study area (BSA) were conducted from 2 to 7 May 2010. An additional survey is scheduled to occur in late summer 2010. The BSA is located approximately 3 mi northwest of the community of Mojave in southeastern Kern County, CA. The BSA provides marginal to suitable habitat for 33 special-status plant species. No federal or state listed plants were observed in the BSA.

Approximately 30 to 40 individuals of Pringle's yampah (*Perideridia pringlei*), a CNPS list 4.3 species, were observed near the southwest corner of the BSA. No other special-status plant species were observed in the BSA.

The May 2010 surveys were conducted during the evident and identifiable period for 25 of the 27 special-status species with the potential to occur in the BSA. Because the May 2010 surveys were conducted outside the published blooming period for *Monardella linoides* ssp. *oblonga* and *Erigeron aequifolius*, it is recommended that surveys be conducted for them in late summer 2010.

Two biological communities in the BSA have a state rarity ranking of S3, Joshua tree woodland (432.35 ac) and Scale broom scrub (0.62 ac). The California Natural Diversity Database (CNDDB) considers communities with state rarity rankings of S1-S3 to be of "high inventory priority" (DFG 2009a). A community with an S3 ranking is considered "rare and threatened" throughout its range by Sawyer et al. (2009).

A total of 107 genera representing 34 different plant families were observed in the BSA during the May 2010 botanical surveys. A total of 160 species were observed in BSA of which 146 are native, 12 are nonnative, and 2 are unknown. Of the 160 species observed, 90 were annual herbs, 60 were perennial herbs, shrubs, or small trees, 1 was a biennial, 1 species can be annual or perennial, and 8 species are unknown.

II. INTRODUCTION

A. Purpose of Report

The purpose of this report is to document the results of botanical surveys conducted to identify special-status plant species that occur in the BSA. This report was prepared under contract to CH2M Hill, Inc., Oakland, CA. The Project contact Ms. Bridget Canty.

B. Project Location

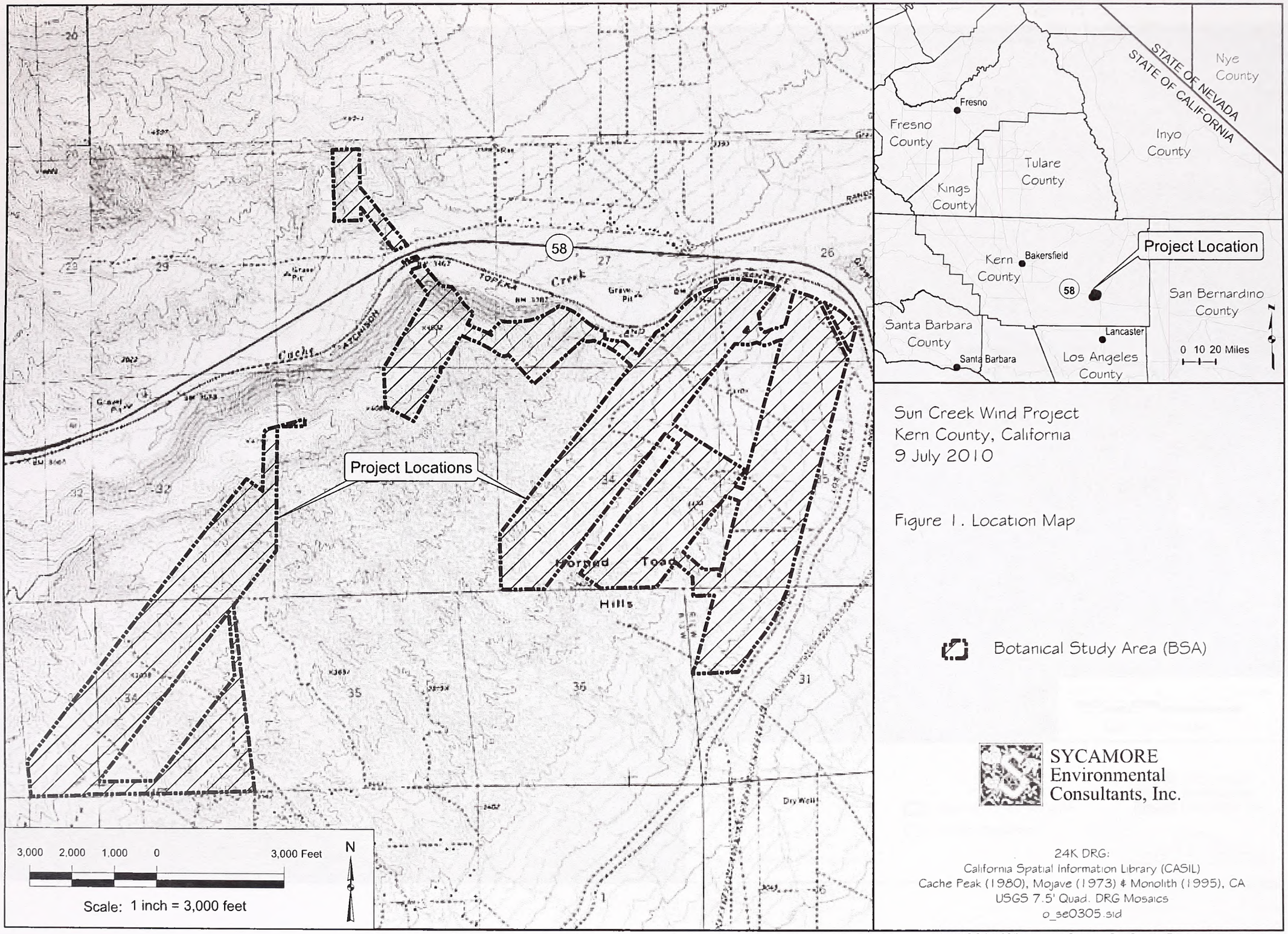
The ± 1,424 ac BSA is located in Kern County, CA on the Mojave and Monolith USGS topographic quads (Figure 1; Table 1). The BSA is located approximately 3 mi northwest of the community of Mojave and approximately 11 mi southeast of the City of Tehachapi in southeast Kern County. The BSA is in the Antelope-Fremont Valleys watershed (hydrologic unit code 18060009), and its centroid is 35.0984° north, -118.2170° west (UTM: Zone 11 S, 389,079 m E, 3,884,669 m W). Figure 2 is an aerial photograph of the BSA dated 18 June 2009.

Table 1. Project USGS quads.

USGS Quad Name	Township, Range, and Sections
Mojave	Portions of T32S, R35E, Sections 26, 27, 28, 32, 33, 34, and 35; T12N, R12W Section 31; T12N, R13W, Section 34
Monolith	Portions of T12N, R13W, Section 31

C. Project Description

The applicant intends to develop a wind energy facility in the BSA. Project design has not yet been completed.



Sun Creek Wind Project
Kern County, California
9 July 2010

Figure 1. Location Map

Botanical Study Area (BSA)

SYCAMORE
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Consultants, Inc.

24K DRG:
California Spatial Information Library (CASIL)
Cache Peak (1980), Mojave (1973) & Monolith (1995), CA
USGS 7.5' Quad. DRG Mosaics
o_se0305.sid

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Sun Creek Wind Project
Kern County, California
9 July 2010

Botanical Survey Area (BSA)

Corridor Boundaries

Figure 2. Aerial Photograph

SYCAMORE Environmental Consultants, Inc.

Aerial Photo:
18 June 2009
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III. STUDY METHODS

The botanical inventory work for this report follows the guidelines set forth by BLM (BLM 2009), USFWS (1996), Department of Fish and Game (DFG 2009b), and the California Native Plant Society (CNPS 2001), where applicable. Scientific nomenclature primarily follows Hickman, ed. (1993).

A. Literature Search

Information on the biology, distribution, taxonomy, legal status, and other aspects of the special-status species was obtained from documents on file in the library of Sycamore Environmental. Standard references used for the biology and taxonomy of plants included Abrams (1923-1960); Baldwin et al. 2002; Hickman, ed. (1993); Jaeger (1969); Simpson and Hasenstab (2009); Munz (1959; 1974); and Sawyer et al. (2009). On-line references included CalPhotos (2010); California Native Plant Society (2010); and the Consortium of California Herbaria (CCH 2010).

Lists of DFG special-status species reviewed included Special Vascular Plants, Bryophytes, and Lichens List (DFG 2010a) and State and Federally Listed Endangered, Threatened, and Rare plants of California (DFG 2010b).

A search of the California Natural Diversity Database (CNDDB, 1 May 2010 version; DFG 2010c) was conducted for the Mojave and Monolith USGS quads and the 10 adjacent USGS quads to determine known records of special-status species in or near the BSA. Table 2 lists the USGS quads evaluated.

Table 2. USGS Quads evaluated.

Tehachapi North	Tehachapi Northeast	Cache Peak	Mojave Northeast
Tehachapi South	**Monolith**	**Mojave**	Sanborn
Tylerhorse Canyon	Willow Springs	Soledad Mtn.	Bissell

The BSA is located in a portion of Kern County that is administered by the Ventura Fish and Wildlife Office (VFWO). Los Angeles and San Bernardino counties are located south and east of the BSA and are also in the area of responsibility of the VFWO. Because the BSA is adjacent to both Los Angeles and San Bernardino counties, Sycamore Environmental obtained lists from VFWO for Kern, Los Angeles, and San Bernardino counties that identify federal-listed plant species that potentially occur in or could be affected by projects in these counties (USFWS 2010).

B. Survey Dates and Personnel

Fieldwork was conducted by R. John Little, Ph.D., Chuck Hughes, M.S., and Michael Bower M.S., on 2, 3, 4, 5, 6, and 7 May 2010. Approximately 144 person-hours were spent in the field conducting the surveys. On 10 June 2010, Mr. Hughes and Mr. Bower conducted a follow-up site visit to collect mature specimens of two species that were not in flower or fruit during the surveys conducted from 2 through 7 May 2010.

C. Survey Methods

Parallel transects were walked by the three botanists throughout the entire 1,424 ac BSA to search for special-status plants. Transect spacing was less than 200 ft to a maximum of 250 ft. All plant species observed were either identified on-site or were collected and identified later. All plants were identified to the level necessary to determine legal status. Appendix A lists the species observed. Fieldwork was conducted during May to coincide with the evident and identifiable period of special-status plants with the potential to occur in the BSA.

This report describes the results of the first round of surveys conducted in the BSA. An additional survey is scheduled to occur in late summer 2010 (pers. comm., B. Canty).

D. Mapping

The location of BSA boundaries was determined using GIS boundary data provided by CH2M Hill that had been uploaded onto a Trimble GeoXT GPS unit. The 18 June 2009 aerial photo in Figures 2 and 4 was downloaded from GlobeXplorer® 2010.

The biological communities were mapped at the alliance level (Sawyer et al. 2009) based on field notes and interpretation of the 18 June 2009 aerial photo, at a scale of 1 inch = 400 ft. The shifts from one biological community to another are often subtle and indistinct, especially in desert areas. The communities are often defined based on the cover of a dominant species exceeding just 1%. In most instances, biological community boundaries represent gradual changes in structurally dominant vegetation, thus, the lines generally do not represent an abrupt change in vegetation on the ground.

E. Problems Encountered and Limitations That May Influence Results

No problems or limitations were encountered that would influence the results of the botanical inventory.

IV. ENVIRONMENTAL SETTING

The BSA is located northwest of the community of Mojave in southeastern Kern County. Elevation in the BSA ranges from approximately 3,150 to 4,180 ft above sea level. Topography in the BSA consists of generally flat to steeply sloping terrain intersected by numerous ephemeral washes. Land use surrounding the BSA consists of existing wind energy facilities to the north and west, the Atchison-Topeka and Santa Fe (Burlington Northern-Santa Fe; BNSF) Railroad, the California Aqueduct, and Hwy. 58 to the north and east, and open land to the south. There are numerous trails throughout the BSA that are used recreationally by off-road recreational vehicles.

A. Soils

Mapped soil units in the BSA include Arizo gravelly loamy sand, 2 to 9 percent slopes; Cajon loamy sand, 0 to 5 percent slopes; Cajon gravelly loamy sand, 0 to 9 percent slopes; Cinco gravelly loamy sand, 50 to 75 percent slopes; Garlock loamy sand, 2 to 9 percent slopes; Pajuela-Whitewolf association, steep; Steuber sandy loam, 5 to 9 percent slopes; Torriorthents-Rock outcrop complex, very steep; (Figure 3).



Sun Creek Wind Project
Kern County, California
9 July 2010

Figure 3. Soils Map

Botanical Survey Area (BSA)

Soil Boundary

104 - Arizo gravelly loamy sand, 2 to 9 percent slopes
114 - Cajon loamy sand, 0 to 5 percent slopes
116 - Cajon gravelly loamy sand, 0 to 9 percent slopes
124 - Cinco gravelly loamy sand, 50 to 75 percent slopes
137 - Garlock loamy sand, 2 to 9 percent slopes
156 - Pajuela-Whitewolf association, steep
176 - Steuber sandy loam, 5 to 9 percent slopes
185 - Torriorthents-Rock outcrop complex, very steep

3,000 2,000 1,000 0 3,000 Feet

N

Scale: 1 inch = 3,000 feet

SYCAMORE Environmental Consultants, Inc.

Soil Survey Geographic (SSURGO) database for Kern County, CA, Southeastern Part (10 December 2007) U.S.D.A., N.R.C.S., URL:http://SoilDataMart.nrcs.usda.gov/
Aerial Photo: 16 Sept. 1992
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10027TGPAltaWindCenter-SunCreek_Fig3SoilsMap.mxd

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Arizo gravelly loamy sand, 2 to 9 percent slopes:
This series consists of very deep, excessively drained soils formed from mixed alluvium. The Arizo series occurs on recent alluvial fans, inset fans, fan apron, fan skirts, stream terraces, floodplains of intermittent streams and channels. Slopes range from 2 to 9 percent. The mean annual precipitation is about 7 inches and the mean annual temperature is about 62° F. Under natural conditions vegetation present consists of creosote bush (*Larrea tridentata*) and bur-sage (*Ambrosia* spp.) (NRCS 2010).

Cajon loamy sand, 0 to 5 percent slopes and Cajon gravelly loamy sand, 0 to 9 percent slopes:
This series consists of very deep, somewhat excessively drained soils that formed in sandy alluvium from dominantly granitic rocks. The Cajon series occurs on alluvial fans, fan aprons, fan skirts, inset fans and river terraces and slopes range from 0 to 9 percent. The average annual precipitation is about 6 inches and the mean annual temperature is about 65° F. Under natural conditions vegetation present consists of creosote bush, saltbush (*Atriplex* spp.), Mormon-tea (*Ephedra* spp.), Joshua tree (*Yucca brevifolia*), Indian ricegrass (*Achnatherum hymenoides*), and other annual grasses and forbs (NRCS 2010).

Cinco gravelly loamy sand, 50 to 75 percent slopes:
The Cinco series consists of deep, well drained soils that formed in material weathered from granitic rocks. Cinco soils occur in uplands and have slopes ranging from 50 to 75 percent. The mean annual precipitation is about 7 inches and the mean annual air temperature is about 60° F. Under natural conditions vegetation present consists of buckwheat (*Eriogonum* spp.), bursage, and sparse cover of annual grasses (NRCS 2010).

Garlock loamy sand, 2 to 9 percent slopes:
The Garlock series consists of very deep, well drained soils formed from mixed alluvial material. Garlock soils occur on old stream terraces and alluvial fans in the Mojave Desert and have slopes of 2 to 9 percent. The mean annual precipitation is approximately 6 inches and the mean annual air temperature is approximately 63° F. Under natural conditions vegetation present on Garlock loamy sand consists of creosote bush, bur-sage, filaree (*Erodium* spp.), buckwheat (*Eriogonum* spp.), desert needlegrass (*Achnatherum speciosum*), Indian ricegrass, and other shrubs and annual species (NRCS 2010).

Pajuela-Whitewolf association, steep:
The Pajuela series consists of deep, somewhat excessively drained soils that formed from mixed alluvium. Pajuela soils occur on old stream terraces at the western edge of the Mojave Desert on slopes ranging from 30 to 50 percent. The mean annual precipitation is about 6 inches, and the mean annual air temperature is about 65° F. Under natural conditions vegetation present on Pajuela series consists of rabbit brush (*Chrysothamnus* spp.), juniper (*Juniperus* spp.), and annual and perennial grasses (NRCS 2010).

The Whitewolf series consists of deep, somewhat excessively drained soils that formed in mixed alluvium. Whitewolf soils occur on flood plains and alluvial fans and have slopes ranging from 0 to 5 percent. The mean annual precipitation is 7 inches, and the mean annual temperature is 64° F. Under natural conditions vegetation present includes annual grasses (NRCS 2010).

Steuber sandy loam, 5 to 9 percent slopes:
The Steuber series consists of deep, well drained soils that formed in mixed alluvium, principally of granitic origin. Steuber soils occur on alluvial fans and stream flood plains and have slopes ranging from 0 to 9 percent. The mean annual precipitation is approximately 11 inches and the mean annual air temperature is about 61° F. Under natural conditions vegetation present includes scattered blue oak or valley oak trees (*Quercus douglasii* and *Q. lobata*) and annual grasses and forbs (NRCS 2010).

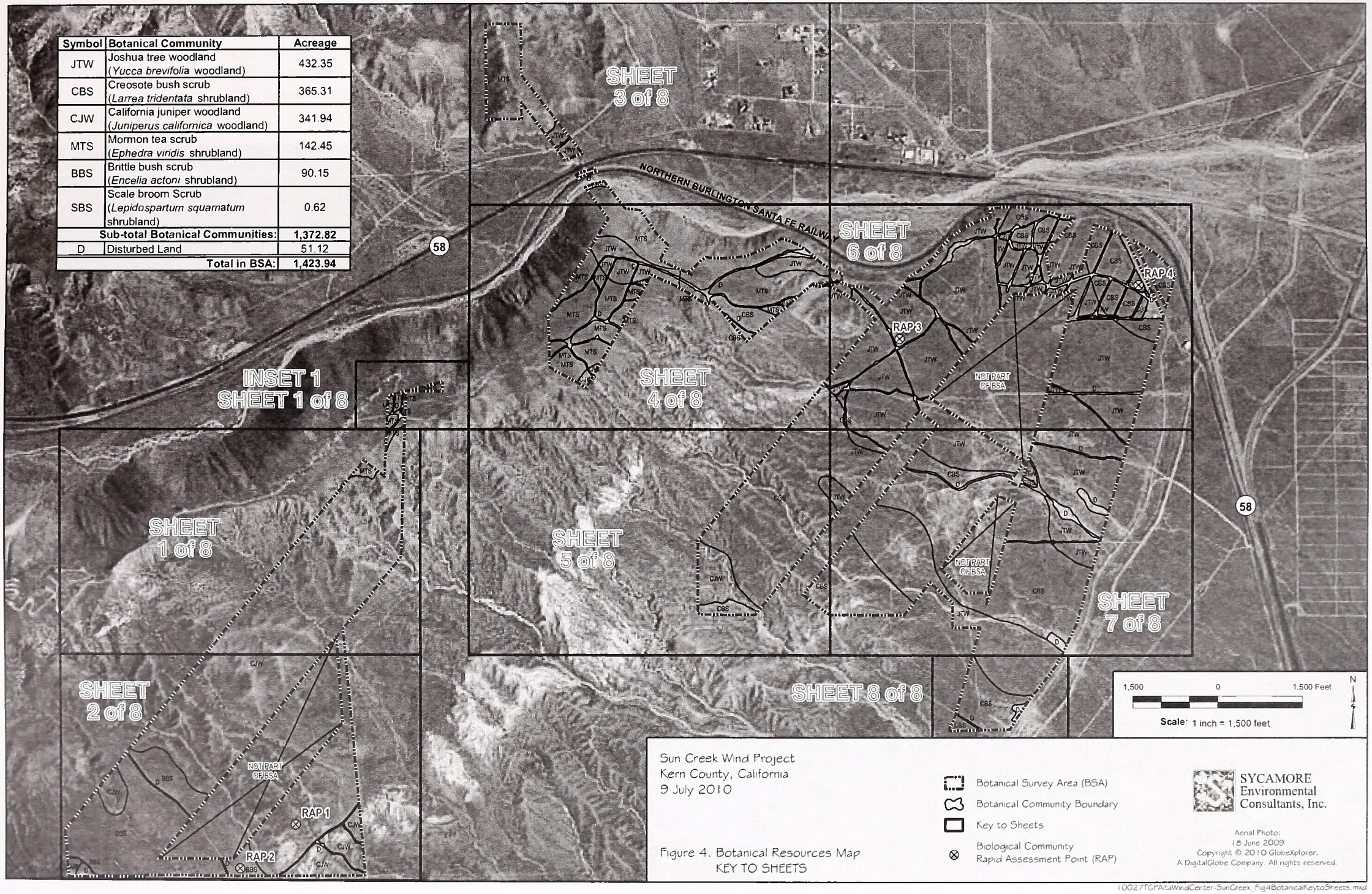
Torriorthents-Rock outcrop complex, very steep:
No descriptions are currently available for these soil types (NRCS 2010).

B. Weather and Climate Conditions

Botanical surveys were conducted on 2, 3, 4, 5, 6, and 7 May 2010. The historic (1982 to present) average precipitation for the Tehachapi gauge through April (based on a precipitation year beginning in October) is 9.67 inches (CDWR 2010). From October 2009 through April 2010 the Tehachapi Airport gauge (located immediately east of the Tehachapi gauge) received approximately 11.7 inches of rain (CDWR 2010), or approximately 121% of the average accumulated precipitation. The BSA had wetter than average spring hydrologic conditions prior to the botanical inventory fieldwork. The Tehachapi and Tehachapi Airport gauges are located approximately 12 mi west of the BSA.

C. Biological Communities

Biological communities are defined by species composition and relative abundance. Biological communities described in this section correlate where applicable with *A Manual of California Vegetation, 2nd Edition* (Sawyer et al. 2009). CNPS Rapid Assessment Protocol data sheets were completed to document biological community types in the BSA and are in Appendix B. Biological communities are mapped in Figure 4 and their acreages are in Table 3. Photographs of the BSA are in Appendix C.



Symbol	Botanical Community	Acreage
JTW	Joshua tree woodland (*Yucca brevifolia* woodland)	432.35
CBS	Creosote bush scrub (*Larrea tridentata* shrubland)	365.31
CJW	California juniper woodland (*Juniperus californica* woodland)	341.94
MTS	Mormon tea scrub (*Ephedra viridis* shrubland)	142.45
BBS	Brittle bush scrub (*Encelia actoni* shrubland)	90.15
SBS	Scale broom Scrub (*Lepidospartum squamatum* shrubland)	0.62
	Sub-total Botanical Communities:	**1,372.82**
D	Disturbed Land	51.12
	Total in BSA:	**1,423.94**

Sun Creek Wind Project
Kern County, California
9 July 2010

Figure 4. Botanical Resources Map
KEY TO SHEETS

Botanical Survey Area (BSA)
Botanical Community Boundary
Key to Sheets
Biological Community Rapid Assessment Point (RAP)

SYCAMORE Environmental Consultants, Inc.

Aerial Photo:
18 June 2009
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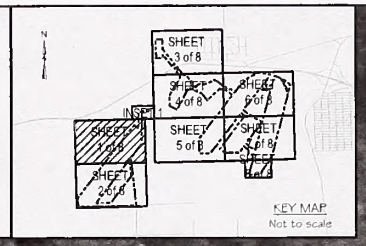
Sun Creek Wind Project
Kern County, California
9 July 2010

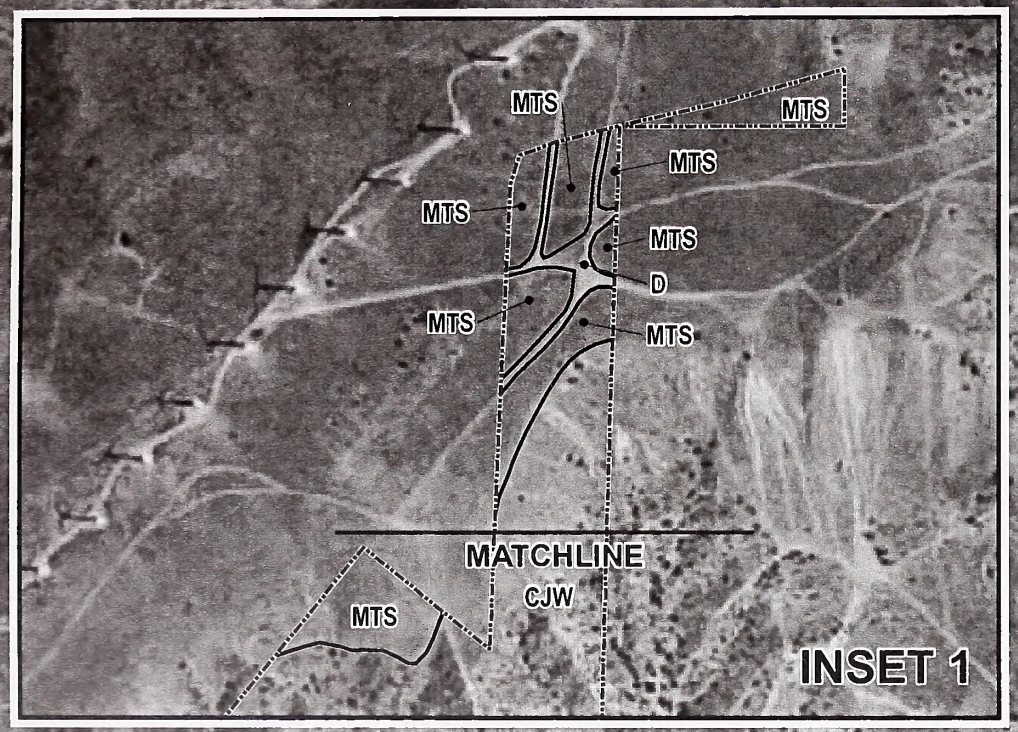
Botanical Survey Area (BSA)
Corridor Boundaries
Botanical Community Boundary

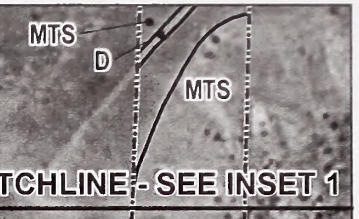
SYCAMORE Environmental Consultants, Inc.

Aerial Photo:
June 2008
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Figure 4. Botanical Resources Map
Sheet 1 of 8





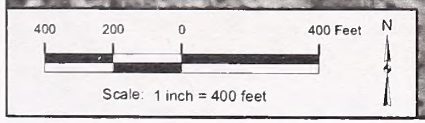




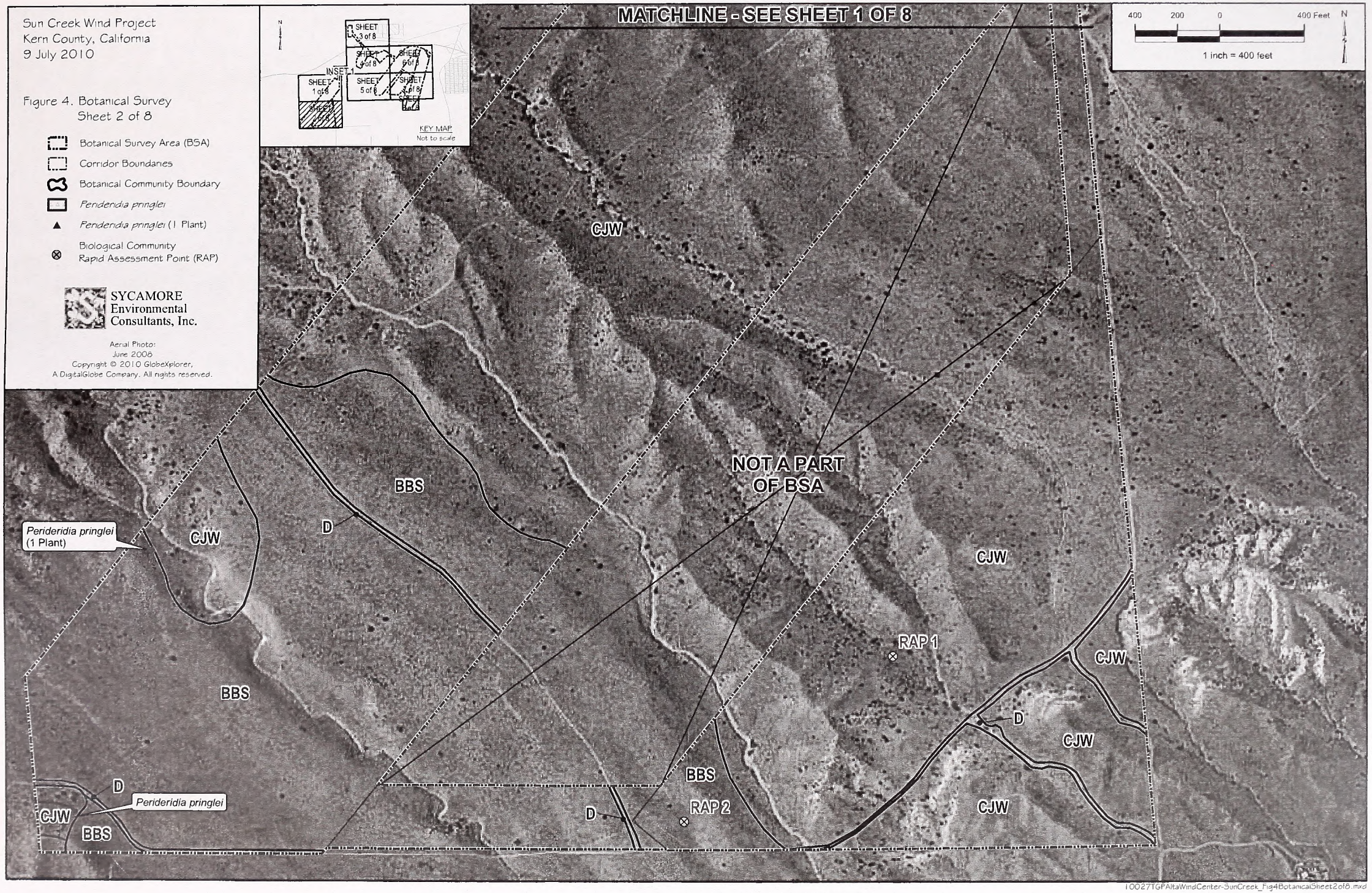
CJW

MATCHLINE - SEE SHEET 2 OF 8

Symbol	Botanical Community
CJW	California juniper woodland (*Juniperus californic*a woodland)
MTS	Mormon tea scrub (*Ephedra viridis* shrubland)
D	Disturbed land



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Symbol	Botanical Community
JTW	Joshua tree woodland (*Yucca brevifolia* woodland)
MTS	Mormon tea scrub (*Ephedra viridis* shrubland)
D	Disturbed land
SBS	Scale broom scrub (*Lepidospartum squamatum* shrubland)

Sun Creek Wind Project
Kern County, California
9 July 2010

Figure 4. Botanical Survey
Sheet 3 of 8

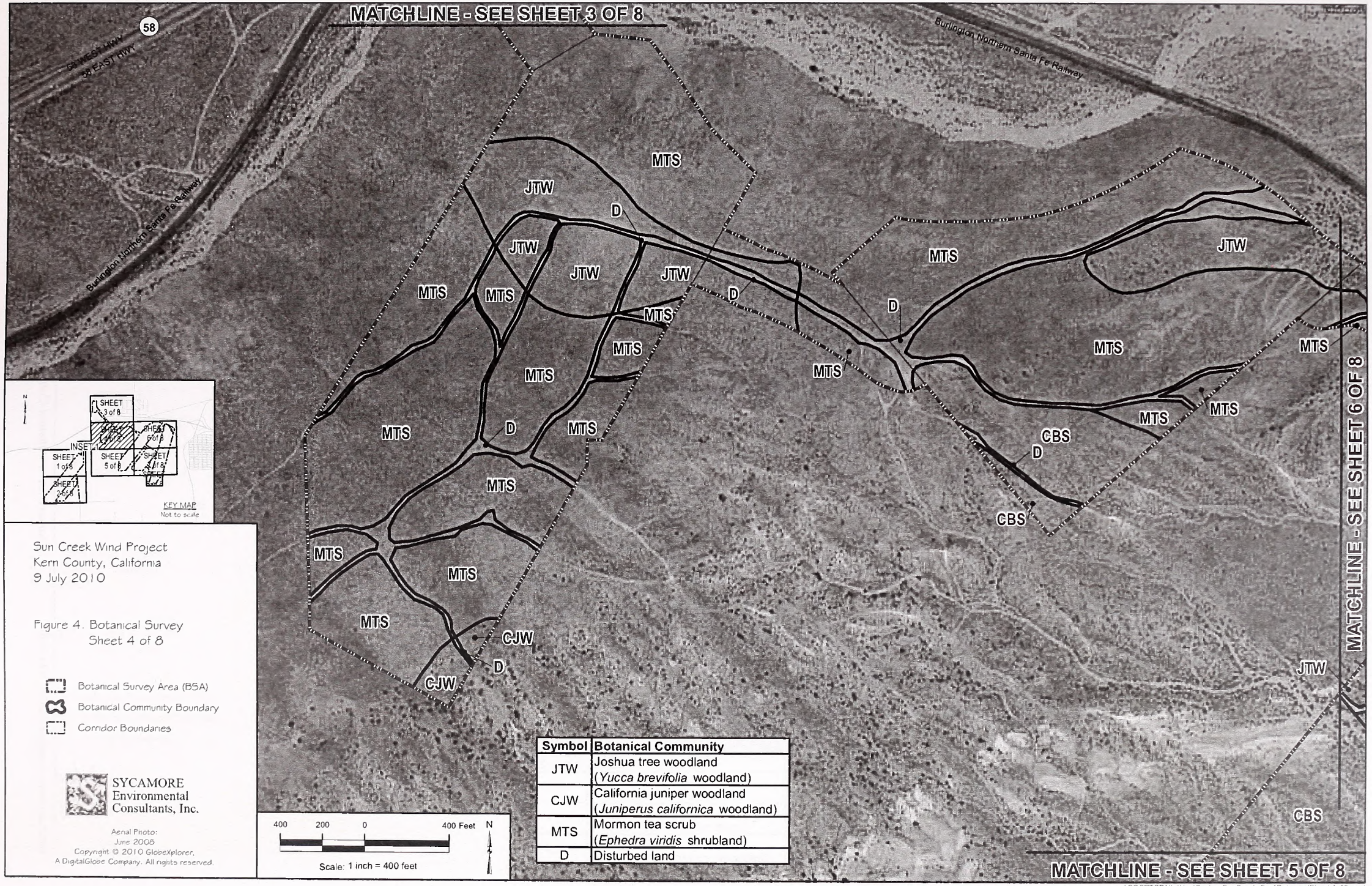
Botanical Survey Area (BSA)
Botanical Community Boundary
Corridor Boundaries

SYCAMORE Environmental Consultants, Inc.

Aerial Photo:
June 2008
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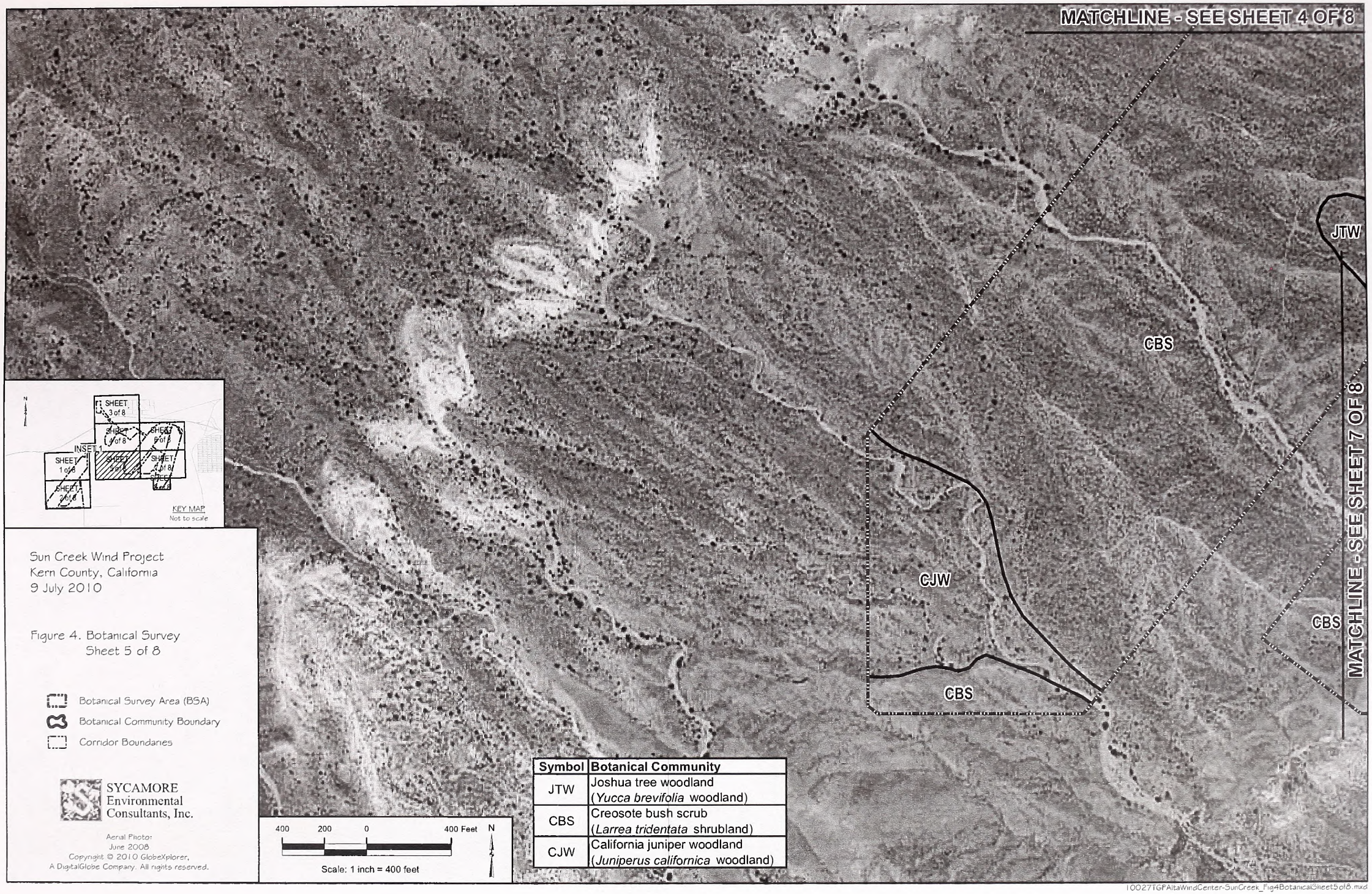
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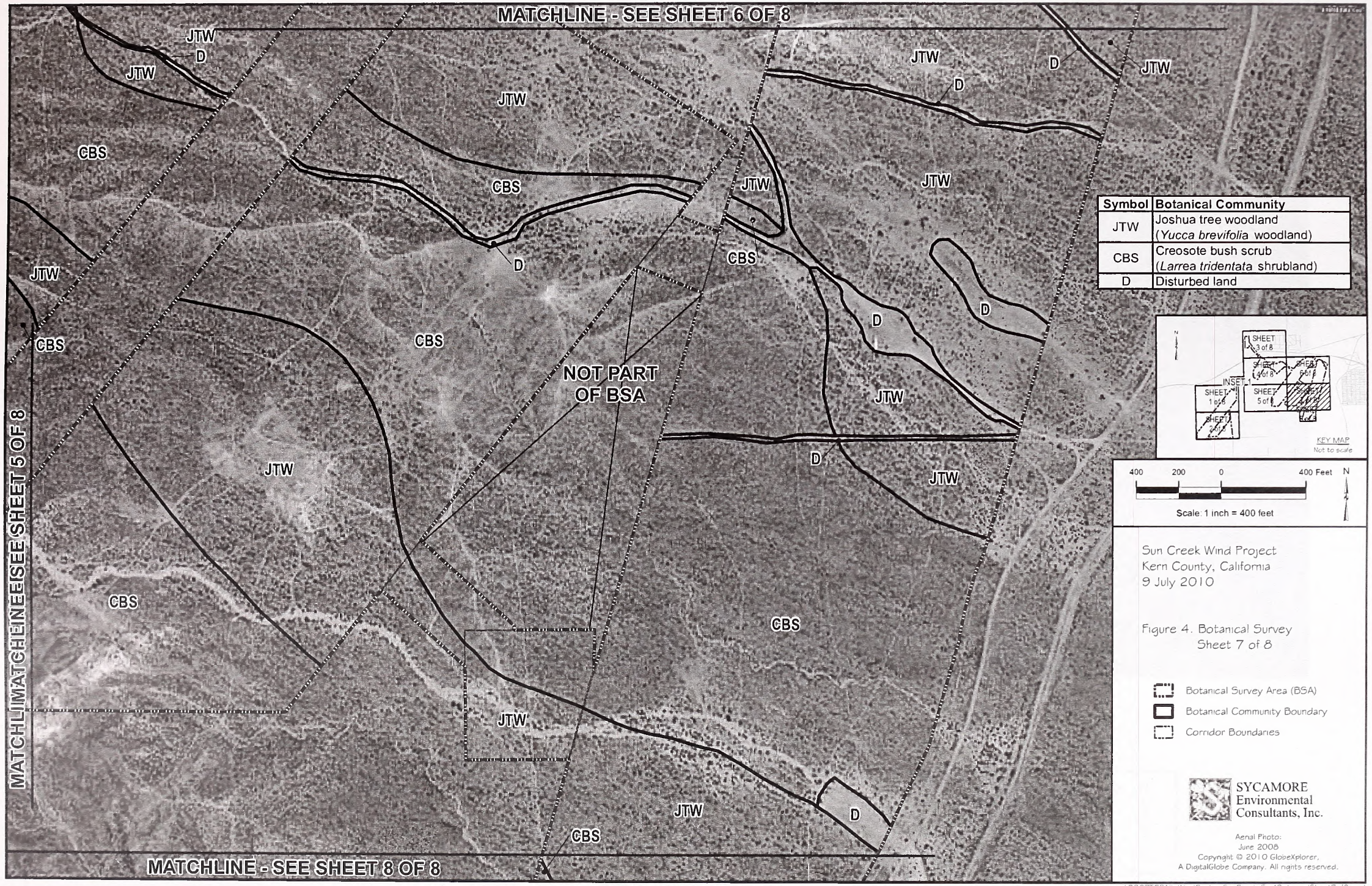
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MATCHLINE - SEE SHEET 4 OF 8
JTW
CBS
CJW
CBS
CBS
MATCHLINE - SEE SHEET 7 OF 8
N
SHEET 3 of 8
SHEET 2 of 8
SHEET 5 of 8
INSET 1
SHEET 1 of 8
SHEET 4 of 8
SHEET 7 of 8
SHEET 6 of 8
SHEET 8 of 8
KEY MAP
Not to scale
Sun Creek Wind Project
Kern County, California
9 July 2010
Figure 4. Botanical Survey
Sheet 5 of 8
Botanical Survey Area (BSA)
Botanical Community Boundary
Corridor Boundaries
SYCAMORE
Environmental
Consultants, Inc.
Aerial Photo:
June 2008
Copyright © 2010 GlobeXplorer,
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400 200 0 400 Feet
N
Scale: 1 inch = 400 feet
Symbol | Botanical Community
JTW | Joshua tree woodland (*Yucca brevifolia* woodland)
CBS | Creosote bush scrub (*Larrea tridentata* shrubland)
CJW | California juniper woodland (*Juniperus californica* woodland)
10027TGFAltaWindCenter-SunCreek_Fig4BotanicalSheet5of8.mxd

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Sun Creek Wind Project
Kern County, California
9 July 2010
Figure 4. Botanical Survey
Sheet 6 of 8
Aerial Photo:
June 2008
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A DigitalGlobe Company. All rights reserved.
Botanical Survey Area (BSA)
Botanical Community Boundary
Corridor Boundaries
Biological Community
Rapid Assessment Point (RAP)
SYCAMORE
Environmental
Consultants, Inc.
400 200 0 400 Feet
N
Scale: 1 inch = 400 feet
Burlington Northern Santa Fe Railway
58
JTW
CBS
D
MTS
RAP 3
RAP 4
NOT PART
OF SURVEY
MATCHLINE - SEE SHEET 4 OF 8
MATCHLINE - SEE SHEET 7 OF 8
SHEET 3 of 8
SHEET 4 of 8
INSET 1
SHEET 1 of 8
SHEET 5 of 8
SHEET 6 of 8
SHEET 2 of 8
KEY MAP
Not to scale

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Symbol	Botanical Community
JTW	Joshua tree woodland (*Yucca brevifolia* woodland)
CBS	Creosote bush scrub (*Larrea tridentata* shrubland)
D	Disturbed land

Sun Creek Wind Project
Kern County, California
9 July 2010

Figure 4. Botanical Survey
Sheet 8 of 8

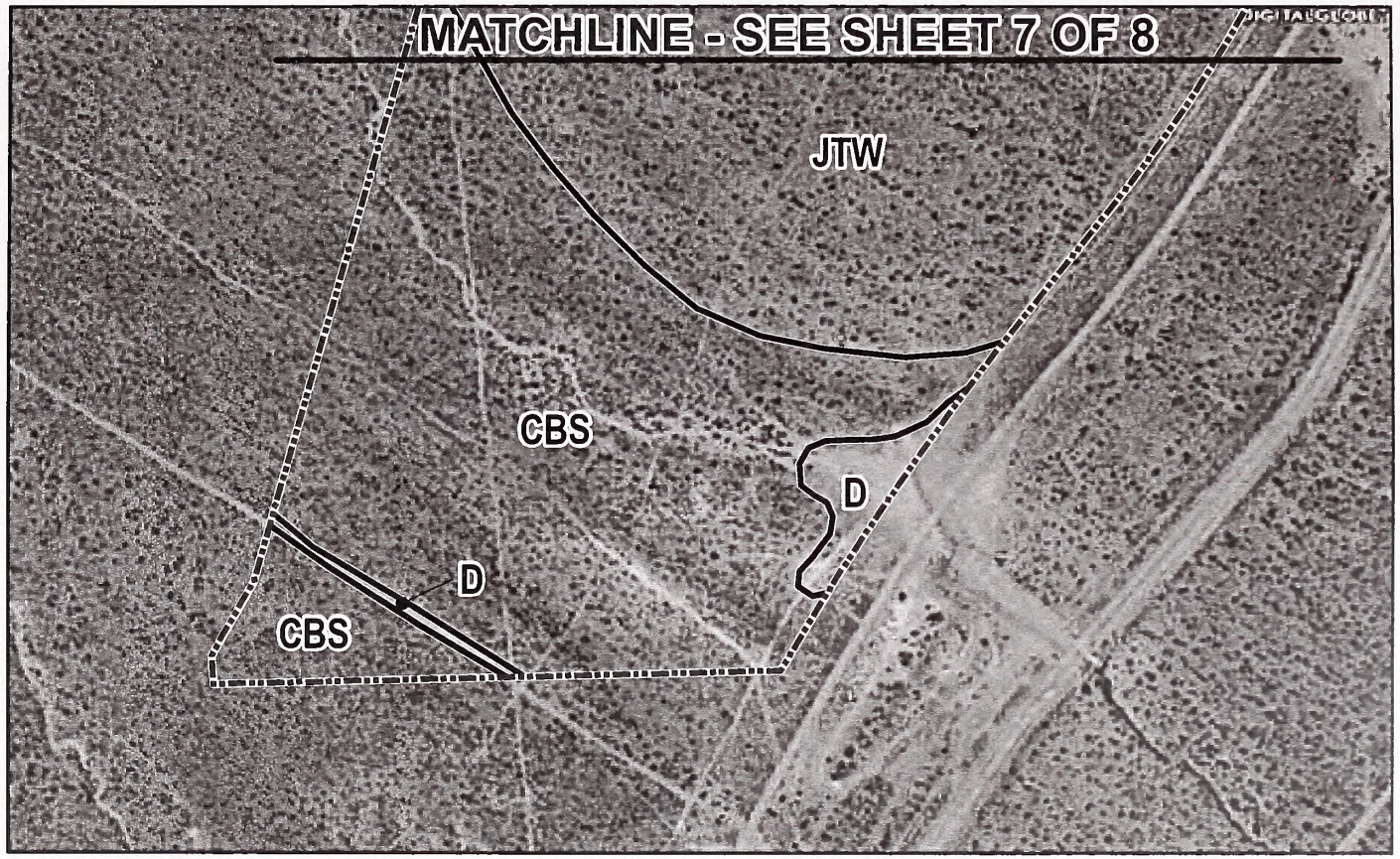
Botanical Survey Area (BSA)

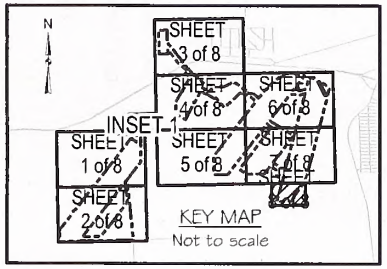
Botanical Community Boundary

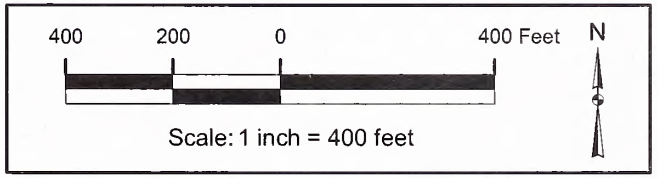
Corridor Boundaries

SYCAMORE
Environmental
Consultants, Inc.

Aerial Photo:
June 2008
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Table 3. Biological and other communities.

Biological Community	Global & State Rarity Rank [1]	Acreage [2]
Joshua tree woodland (*Yucca brevifolia* woodland)	G4 S3	432.35
Creosote bush scrub (*Larrea tridentata* shrubland)	G5 S5	365.31
California juniper woodland (*Juniperus californica* woodland)	G4 S4	341.94
Mormon tea scrub (*Ephedra viridis* shrubland)	G4 S4	142.45
Brittle bush scrub [3] (*Encelia actoni* shrubland)	--	90.15
Scale broom scrub (*Lepidospartum squamatum* shrubland)	G3 S3	0.62
Other Communities		
Disturbed Land	--	51.12
	Total:	**1,423.94**

[1] DFG (2009a).
[2] Acreages were calculated using AutoCAD® functions.
[3] There is no biological community at the alliance level that is defined by *Encelia actoni* in Sawyer et al. 2009. Three other alliances are defined by other species of *Encelia*.

1. Joshua Tree Woodland

This is the dominant community in the BSA and has greater than 1% cover of Joshua trees (*Yucca brevifolia*) and less than 1% cover of California juniper (*Juniperus californica*) (Appendix C, Photo 2). The Joshua trees are emergent through an open shrub canopy that has much greater cover than the Joshua trees. Common shrubs include creosote bush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), goldenbush (*Ericameria* spp.), Mormon tea (*Ephedra viridis*), California buckwheat (*Eriogonum fasciculatum* var. *polifolium*), winter fat (*Krascheninnikovia lanata*), burrobrush (*Hymenoclea salsola*), hop-sage (*Grayia spinosa*), and peppergrass (*Lepidium fremontii* var. *fremontii*). Common plants in the herb layer are foxtail chess (*Bromus madritensis* ssp. *rubens*), filaree (*Erodium cicutarium*), pincushion (*Chaenactis* spp.), *Cryptantha* spp., and sun cup (*Camissonia* spp.). Joshua tree woodland has a state rarity rank of S3 and is considered of high inventory priority to CNDDB (DFG 2009a).

2. Creosote Bush Scrub

This community is similar to Joshua tree woodland in the shrub and herb layers, but Joshua trees are mostly absent (Appendix C, Photo 1). Overall Joshua tree cover is less than 1% and creosote bush is the shrub with the greatest cover. Creosote bush scrub has a state rarity rank of S5 and is not considered to be of high inventory priority to CNDDB (DFG 2009a).

3. California Juniper Woodland

This community has at least 1% cover of California juniper. Joshua tree is often present, but overall has less cover than California juniper (Appendix C, Photo 3). Common shrubs include goldenbush, California buckwheat, Mormon tea, and brittle bush (*Encelia actoni*). The herb layer is similar to Joshua tree woodland, except that where the California juniper woodland borders brittle bush scrub, foxtail chess and filaree have substantially invaded and replaced the native herb community. In the BSA, California juniper woodland tends to occur upslope of and west of the Joshua tree woodland and creosote bush scrub. California juniper woodland has a state rarity rank of S4 and is not considered to be of high inventory priority to CNDDB (DFG 2009a).

4. Mormon Tea Scrub

In this community Mormon tea is the most common shrub and has a cover of greater than 1% (Appendix C, Photo 4). Other common shrubs include goldenbush, brittle bush, peppergrass, and California buckwheat. Joshua tree and California juniper are occasional but very sparse. The herb layer is similar to Joshua tree woodland, except that in some areas desert needlegrass (*Achnatherum speciosum*) is much more common. This community tends to occur on or near ridge tops in the highest elevations of the BSA. Mormon tea scrub has a state rarity rank of S4 and is not considered to be of high inventory priority to CNDDB (DFG 2009a).

5. Brittle Bush Scrub

In this community brittle bush is the most common shrub and has a cover of greater than 1% (Appendix C, Photo 5). Other common shrubs include goldenbush and California buckwheat. Joshua tree and California juniper are occasional, but very sparse. In the BSA, foxtail chess and filaree have substantially invaded and replaced the native herb community, although the native perennial bunchgrass desert needlegrass is still common.

6. Scale Broom Scrub

Scale broom (*Lepidospartum squamatum*) has greater than 1% cover and is the most common shrub in this community. This community occurs in one small area where the BSA includes a segment of Cache Creek near the BNSF railroad tracks (Figure 4). Cache Creek is the largest wash in the BSA and its boundary is very distinct due to a very steep slope immediately south of and adjacent to the wash. Scale broom scrub has a state rarity rank of S3 and is considered a high inventory priority to CNDDB (DFG 2009a).

7. Disturbed Land

The vegetation and soil surface in areas mapped as disturbed land have been severely disturbed by human activity. This area contains wide dirt roads and several areas of intense off-road vehicle and camping use where vegetation is mostly lacking.

D. The Existing Level of Disturbance

Aside from the areas specifically mapped as "disturbed land," much of the western area of the BSA contains roads, trails, and clearings used by off-road vehicles (ORV) and campers. A few areas have very concentrated ORV use, but still contain substantial vegetation and were not mapped as "disturbed land." Part of the northeastern area of the BSA once contained windmills and their concrete footings and dirt access roads to them are still present.

V. BOTANICAL RESOURCES IN THE BOTANICAL STUDY AREA

A. Determination of Special-Status Plants in the Botanical Study Area

File data from CNDDB, USFWS, BLM, and CH2M Hill were used to determine the special-status plants that could potentially occur in the BSA. A CNDDB summary report for the Mojave, Monolith and the 10 surrounding USGS quads is in Appendix D. The USFWS lists of special-status species that could occur in or be affected by the project is in Appendix E. Lists of BLM sensitive species are in Appendix F. CH2M Hill provided a list of special-status plants species that were also evaluated (Appendix G). Kern County does not maintain a list of plant species that are of local concern (pers. comm., C. Casdorph).

Field surveys were conducted by Sycamore Environmental botanists to determine if habitat for special-status species identified in the file data was present in the BSA. Special-status species for which suitable habitat is present in the BSA are listed in Table 4. Special-status species are defined as those listed, candidate, or proposed under the federal or state endangered species acts; species listed under the California Native Plant Protection Act; species identified as sensitive by the BLM, and species that are in the CNPS Inventory of Rare and Endangered Plants of California (CNPS 2010). The DFG California Natural Diversity Database (CNDDB) tracks special-status species as well as species that have not been designated as special-status by DFG. Species that do not have formal state or federal special-status designations are not evaluated in this report.

B. Special-Status Plant Species not in the Botanical Study Area

Special-status plant species for which suitable habitat is not present, or whose distributional limits preclude the possibility of their occurrence in the BSA, are not discussed in Section V.C of this report. An evaluation of these species is in Appendix H.

C. Evaluation of Special-Status Plants

Spanish Needle onion (*Allium shevockii*)

HABITAT AND BIOLOGY: A bulbiferous herb found on rocky substrates in pinyon and juniper woodland and upper montane coniferous forest from 2,700 to 8,300 ft. Blooms May through June (CNPS 2010).

RANGE: In CA, known from fewer than 10 occurrences in Kern County (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave or Monolith quads. The closest CNDDB record for this species is from 1995, located approximately 6.45 mi northwest of the BSA on the Tehachapi Northeast quad.

HABITAT PRESENT IN THE BSA: Upper montane coniferous forest does not occur in the BSA. The California juniper woodland in the BSA provides marginal habitat for this species.

DISCUSSION: Spanish Needle onion was not observed in the BSA during botanical surveys that were conducted during the evident and identifiable period. *Allium fimbriatum* var. *fimbriatum* was observed in the BSA. No other species of *Allium* were observed in the BSA.

Table 4. Special-status plants with the potential to occur in the BSA.

Special-Status Plant Species	Common Name	Federal Status [a] / BLM [a]	State Status [a] / CNPS [b]	Source [c]	Observed in the BSA
Allium shevockii	Spanish Needle onion	--/ Sensitive	--/ 1B.3	2, 3	No
Astragalus albens	Cushenbury milk-vetch	E/ --	--/ 1B.1	1	No
Astragalus atratus var. *mensanus*	Darwin Mesa milk-vetch	--/ Sensitive	--/ 1B.1	3	No
Astragalus jaegerianus	Lane Mountain milk-vetch	E/ --	--/ 1B.1	1	No
Canbya candida	White pygmy-poppy	--/ Sensitive	--/ 4.2	2, 3	No
Cymopterus deserticola	Desert cymopterus	--/ Sensitive	--/ 1B.2	3	No
Enceliopsis covillei	Panamint daisy	--/ Sensitive	--/ 1B.2	3	No
Erigeron aequifolius	Hall's daisy	--/ Sensitive	--/ 1B.3	3	No
Erigeron parishii	Parish's daisy	T, CH/ --	--/ 1B.1	1	No
Eriogonum contiguum	Reveal's buckwheat	--/ --	--/ 2.3	3	No
Eriogonum kennedyi var. *pinicola*	Kern buckwheat	--/ Sensitive	--/ 1B.1	2, 3	No
Eriophyllum mohavense	Barstow woolly sunflower	--/ Sensitive	--/ 1B.2	2, 3	No
Eschscholzia minutiflora ssp. *twisselmannii*	Red Rock poppy	--/ Sensitive	--/ 1B.2	2, 3	No
Layia heterotricha	Pale-yellow layia	--/ Sensitive	--/ 1B.1	2	No
Loeflingia squarrosa var. *artemisiarum*	Sagebrush loeflingia	--/ Sensitive	--/ 2.2	2	No
Lupinus magnificus var. *magnificus*	Panamint Mountains lupine	--/ Sensitive	--/ 1B.2	3	No
Mimulus pictus	Calico monkeyflower	--/ Sensitive	--/ 1B.2	2	No
Mimulus shevockii	Kelso Creek monkeyflower	--/ Sensitive	--/ 1B.2	3	No
Monardella linoides ssp. *oblonga*	Flax-like (=Tehachapi) monardella	--/ Sensitive	--/ 1B.3	2, 3	No
Opuntia basilaris var. *treleasei*	Bakersfield cactus	E/ Sensitive	E/ 1B.1	3	No
Oxytheca parishii var. *goodmaniana*	Cushenbury oxytheca	E/ --	--/ 1B.1	1	No
Petalonyx thurberi ssp. *gilmanii*	Death Valley sandpaper plant	--/ Sensitive	--/ 1B.3	3	No
Perideridia pringlei	Adobe yampah	--/ --	--/ 4.3	4	Yes
Phacelia mustelina	Round-leaved phacelia	--/ Sensitive	--/ 1B.3	3	No
Phacelia nashiana	Charlotte's phacelia	--/ Sensitive	--/ 1B.2	2, 3	No
Streptanthus cordatus var. *piutensis*	Piute Mountains jewel-flower	--/ Sensitive	--/ 1B.2	2, 3	No
Viola aurea	Golden violet	--/ --	--/ 2.2	2, 3	No

[a] **Listing Status** Federal status determined from USFWS letter (USFWS 2010). State status determined from DFG (20010a, b, and e). BLM status determined from BLM website (BLM 2010). Codes inelude:
E = Endangered; **T** = Threatened; **P** = Proposed; **C** = Candidate; **R** = California Rare; * = Possibly extinct, Sensitive = BLM Sensitive.

[b] **Codes** in table are as follows:

CNPS List: **1A** = Presumed Extinct in CA; **1B** = Rare or Endangered (R/E) in CA and elsewhere; **2** = R/E in CA and more common elsewhere; **3** = Need more information; **4** = Plants of limited distribution.

CNPS List Decimal Extensions: **.1** = Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat); **.2** = Fairly endangered in CA (20-80% of occurrences threatened); **.3** = Not very endangered in CA (< 20% of occurrences threatened or no current threats known).

[c] **Sources** **1** = From USFWS letters (USFWS 2010), **2** = From CNDDB (DFG 2010), **3** = From list provided by CH2M Hill (pers. comm., B. Canty; see Appendix G), **4** = Observed by Syeamore Environmental.

Cushenbury milk-vetch (*Astragalus albens*)

HABITAT AND BIOLOGY: A perennial herb found in Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodland usually on carbonate substrate (rarely granitic) from 3,600 to 6,600 ft elevation. Blooms March through June (CNPS 2010).

RANGE: In CA, known from fewer than 20 occurrences in San Bernardino County (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave, Monolith, and 10 adjacent quads. The closest CNDDB record for this species is from 1996, located approximately 88.5 mi southeast of the BSA on the Fawnskin quad.

HABITAT PRESENT IN THE BSA: The BSA is outside the known geographic range of this species. Habitat for this species occurs in the BSA.

DISCUSSION: Cushenbury milk-vetch was not observed in the BSA during botanical surveys conducted during the evident and identifiable period. *Astragalus didymocarpus* var. *didymocarpus*, *A. pachypus* var. *pachypus*, and *A. purshii* var. *tinctus* were observed in the BSA. No other species of *Astragalus* were observed in the BSA.

Darwin Mesa milk-vetch (*Astragalus atratus* var. *mensanus*)

HABITAT AND BIOLOGY: A perennial herb found in Great Basin scrub, Joshua tree woodland, and on volcanic clay and gravelly soils in pinyon and juniper woodland from 5,380 to 7,600 ft. Blooms April through June (CNPS 2010).

RANGE: In CA, known from Inyo County (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave, Monolith, and 10 adjacent quads. The closest CNDDB record for this species is from 2001, located approximately 66.7 mi northeast of the BSA on the Cactus Peak quad.

HABITAT PRESENT IN THE BSA: The BSA is outside the known geographic and elevation range of this species. The Joshua tree woodland in the BSA provides marginal habitat for this species.

DISCUSSION: Darwin Mesa milk-vetch was not observed in the BSA during botanical surveys conducted during the evident and identifiable period. *Astragalus didymocarpus* var. *didymocarpus*, *A. pachypus* var. *pachypus* and *A. purshii* var. *tinctus* were observed in the BSA. No other species of *Astragalus* were observed in the BSA.

Lane Mountain milk-vetch (*Astragalus jaegerianus*)

HABITAT AND BIOLOGY: A perennial herb found in Joshua tree woodland and Mojavean desert scrub on granitic sandy or gravelly substrate from 2,900 to 3,900 ft. Blooms April through June (CNPS 2010).

RANGE: In CA, known from fewer than 10 occurrences in San Bernardino County totaling near 1,000 individual plants in 2001 (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave, Monolith, or 10 adjacent quads. The closest CNDDB record for this species is from 2001, located approximately 64.8 mi east of the BSA on the Mud Hills quad.

HABITAT PRESENT IN THE BSA: The BSA is outside the known geographic range of this species. The BSA provides marginal habitat for this species.

DISCUSSION: Lane Mountain milk-vetch was not observed in the BSA during botanical surveys that were conducted during the evident and identifiable period. *Astragalus didymocarpus* var.

didymocarpus, *A. pachypus* var. *pachypus* and *A. purshii* var. *tinctus* were observed in the BSA. No other species of *Astragalus* were observed in the BSA.

White pygmy-poppy (*Canbya candida*)

HABITAT AND BIOLOGY: An annual herb found on gravelly, sandy, and granitic substrates in Joshua tree "woodland," Mojavean desert scrub, and pinyon and juniper woodland from 1,900 to 4,800 ft. Blooms March through June (CNPS 2010).

RANGE: In CA, known from Imperial, Inyo, Kern, Los Angeles, and San Bernardino counties (CNPS 2010).

KNOWN RECORDS: The closest CNDDB record is from 1935. The CNDDB record polygon is geographically imprecise and has a radius of 1 mi. The outer edge of the polygon intersects the southeast tip of the BSA.

HABITAT PRESENT IN THE BSA: Habitat for this species occurs in the BSA.
DISCUSSION: White pygmy-poppy was not observed in the BSA during botanical surveys conducted during the evident and identifiable period. (*Canbya candida* is the only species in the genus *Canbya*.)

Desert cymopterus (*Cymopterus deserticola*)

HABITAT AND BIOLOGY: A perennial herb found on sandy substrates in Joshua tree woodland and Mojavean desert scrub from 2,000 to 5,000 ft. Blooms March through May (CNPS 2010).

RANGE: In CA, known from Kern, Los Angeles, and San Bernardino counties (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave, Monolith, or 10 adjacent quads. The closest CNDDB record for this species is from 1995, located approximately 17.2 mi southeast of the BSA on the Edwards quad.

HABITAT PRESENT IN THE BSA: Habitat for this species occurs in the BSA.
DISCUSSION: Desert cymopterus was not observed in the BSA during botanical surveys conducted during the evident and identifiable period. No species of *Cymopterus* were observed in the BSA.

Panamint daisy (*Enceliopsis covillei*)

HABITAT AND BIOLOGY: A perennial herb found in Mojavean desert scrub from 1,300 to 6,000 ft. This species is also known to occur on clayey or rocky subalkaline canyon sides and sandy washes (BLM 2010). Blooms March through June (CNPS 2010).

RANGE: In CA, known from Inyo County (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave, Monolith, or 10 adjacent quads. The closest CNDDB record has no date and is located approximately 21.9 mi northeast of the BSA on the Ballarat quad.

HABITAT PRESENT IN THE BSA: Habitat for this species occurs in the BSA.
DISCUSSION: Panamint daisy was not observed in the BSA during botanical surveys conducted during the evident and identifiable period. No species of *Enceliopsis* were observed in the BSA.

Hall's daisy (*Erigeron aequifolius*)

HABITAT AND BIOLOGY: A rhizomatous herb found in broadleaved upland forest, lower montane coniferous forest, pinyon and juniper woodland, and upper montane coniferous forest from 4,920 to 7,870 ft. Blooms July through August (CNPS 2010).

RANGE: In CA, known from fewer than 20 occurrences in Fresno, Kern, and Tulare counties (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave, Monolith, or 10 adjacent quads. The closest CNDDB record is from 1986, approximately 44.5 mi northeast of the BSA on the Owens Peak quad.

HABITAT PRESENT IN THE BSA: Marginal habitat for this species occurs in the BSA. The BSA is located outside the known elevation range of this species (CNPS 2010).

DISCUSSION: Because the May 2010 surveys were conducted outside its published blooming period, it is recommended that surveys be conducted for this species in late summer 2010. No species of *Erigeron* were observed in the BSA during the May 2010 botanical surveys.

Parish's daisy (*Erigeron parishii*)

HABITAT AND BIOLOGY: A perennial herb usually found on carbonate substrate (sometimes granitic) in Mojavean desert scrub and pinyon and juniper woodland from 2,600 to 6,600 ft. This species also occurs in upper montane coniferous forests (BLM 2010). Blooms May through August (CNPS 2010).

RANGE: In CA, known from Riverside and San Bernardino counties around the northern base of the San Bernardino Mountains near Cushenbury Canyon; in the Little San Bernardino Mountains; and in the hills around Yucca Valley (CNPS 2010; BLM 2010). Not known from Kern County (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave, Monolith, or 10 adjacent quads. The closest CNDDB record is from 1988, approximately 84.2 mi southeast of the BSA on the Butler Peak quad.

HABITAT PRESENT IN THE BSA: Marginal habitat for this species occurs in the BSA. The BSA is located outside the known geographic range of this species (CNPS 2010).

DISCUSSION: Parish's daisy was not observed in the BSA during botanical surveys conducted during the evident and identifiable period. No species of *Erigeron* were observed in the BSA.

Reveal's buckwheat (*Eriogonum contiguum*)

HABITAT AND BIOLOGY: An annual herb found in Mojavean desert scrub from 100 to 4,350 ft. Blooms March through May (CNPS 2010).

RANGE: In CA, known from Inyo and San Bernardino counties (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave, Monolith, or 10 adjacent quads. The closest CNDDB record is from 1977, approximately 84.9 mi southeast of the BSA on the Manly Peak quad.

HABITAT PRESENT IN THE BSA: The BSA is outside the known geographic range of this species. Habitat for this species occurs in the BSA.

DISCUSSION: Reveal's buckwheat was not observed in the BSA during botanical surveys conducted during the evident and identifiable period. *Eriogonum angulosum*, *E. fasciculatum* var. *polifolium*, *E. gracillimum*, *E. nudum* var. *westonii*, *E. pusillum*, *E. reniforme*, *E. trichopes*, and *E. viridescens* were observed in the BSA. A ninth species of *Eriogonum*, a perennial shrub, was also observed in the BSA, but could not be identified to species due to the lack of flowers. This unknown species of *Eriogonum* is a perennial shrub. Morphological characteristics observed in collected specimens and photographs confirm that this shrub is not *E. contiguum*.

Kern buckwheat (*Eriogonum kennedyi* var. *pinicola*)

HABITAT AND BIOLOGY: A perennial herb found on clay substrates in chaparral and pinyon and juniper woodland from 4,300 to 6,400 ft. Blooms May through June (CNPS 2010).

RANGE: In CA, known from only three occurrences in the Sweet Ridge area of Kern County (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave or Monolith quads. The closest CNDDB record is from 1996, approximately 2.3 mi north of the BSA on the Cache Peak quad.

HABITAT PRESENT IN THE BSA: Chaparral does not occur in the BSA. The BSA is slightly lower in elevation that the known elevation range of this species. The California juniper woodland in the BSA provides marginal habitat for this species.

DISCUSSION: Kern buckwheat was not observed in the BSA during botanical surveys conducted during the evident and identifiable period. *Eriogonum angulosum*, *E. fasciculatum* var. *polifolium*, *E. gracillimum*, *E. nudum* var. *westonii*, *E. pusillum*, *E. reniforme*, *E. trichopes*, and *E. viridescens* were observed in the BSA. A ninth species of *Eriogonum*, a perennial shrub, was also observed in the BSA, but could not be identified to species due to the lack of flowers. This unknown species of *Eriogonum* is a perennial shrub. Morphological characteristics observed in collected specimens and photographs confirm that this shrub is not *E. kennedyi* var. *pinicola*.

Barstow woolly sunflower (*Eriophyllum mohavense*)

HABITAT AND BIOLOGY: An annual herb found in chenopod scrub, Mojavean desert scrub and playas from 1,600 to 3,200 ft. Blooms April through May (CNPS 2010).

RANGE: In CA, known from Fresno, Kern, Los Angeles, and San Bernardino counties (CNPS 2010).

KNOWN RECORDS: The closest CNDDB record is from 2003, approximately 8.1 mi southeast of the BSA on the Sanborn quad.

HABITAT PRESENT IN THE BSA: Habitat for this species occurs in the BSA.

DISCUSSION: Barstow woolly sunflower was not observed in the BSA during the botanical inventory conducted during the evident and identifiable period. *Eriophyllum wallacei* and *Eriophyllum pringlei* were observed in the BSA. No other species of *Eriophyllum* were observed in the BSA.

Red Rock poppy (*Eschscholzia minutiflora* ssp. *twisselmannii*)

HABITAT AND BIOLOGY: An annual herb found on volcanic tuff substrates in Mojavean desert scrub from 2,200 to 4,100 ft. Blooms March through May (CNPS 2010).

RANGE: In CA, known from the Rand and El Paso mountains in Kern and San Bernardino counties (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave, Monolith, or 10 adjacent quads. The closest CNDDB record is from 1988, approximately 13.8 mi northeast of the BSA on the Cinco quad.

HABITAT PRESENT IN THE BSA: Marginal habitat for this species occurs in the BSA. The BSA is located outside the known geographic range of this species (CNPS 2010).

DISCUSSION: Red Rock poppy was not observed in the BSA during the botanical inventory conducted during the evident and identifiable period. *Eschscholzia minutiflora* ssp. *covillei* was observed in the BSA. No other species of *Eschscholzia* were observed in the BSA.

Pale-yellow layia (*Layia heterotricha*)

HABITAT AND BIOLOGY: An annual herb found on alkaline or clay substrates in cismontane woodland, coastal scrub, pinyon and juniper woodland, and Valley and foothill grassland from 900 to 5,600 ft. Blooms March through June (CNPS 2010).

RANGE: In CA, known from Fresno, Los Angeles, Monterey, Santa Barbara, and Ventura counties. Extirpated or uncertain records exist from Kings, Kern, San Benito, and San Luis Obispo counties (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave or Monolith quads. The closest CNDDB record is from 1988, approximately 5.4 mi northwest of the BSA on the Tehachapi Northeast quad.

HABITAT PRESENT IN THE BSA: The BSA provides marginal habitat for this species.

DISCUSSION: Pale-yellow layia was not observed in the BSA during the botanical inventory conducted during the evident and identifiable period. *Layia glandulosa* was observed in the BSA. No other species of *Layia* were observed in the BSA.

Sagebrush loeflingia (*Loeflingia squarrosa* var. *artemisiarum*)

HABITAT AND BIOLOGY: An annual herb found on sandy substrates in desert dunes, Great Basin scrub, and Sonoran desert scrub from 2,200 to 5,300 ft. Blooms April through May (CNPS 2010).

RANGE: In CA, known from Inyo, Kern, Lassen, Los Angeles, and San Bernardino counties (CNPS 2010). This species is also known to occur in Nevada, Oregon, and Wyoming (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave or Monolith quads. The closest CNDDB record is from 1998, approximately 8.5 mi southeast of the BSA on the Soledad Mountain quad.

HABITAT PRESENT IN THE BSA: Habitat for this species occurs in the BSA.

DISCUSSION: Sagebrush loeflingia was not observed in the BSA during the botanical inventory conducted during the evident and identifiable period. No varieties of *Loeflingia squarrosa* were observed in the BSA.

Panamint Mountains lupine (*Lupinus magnificus* var. *magnificus*)

HABITAT AND BIOLOGY: A perennial herb found in Great Basin scrub, Mojavean desert scrub, and upper montane coniferous forest from 3,280 to 7,500 ft. Blooms April through June (CNPS 2010).

RANGE: In CA, known from about 10 occurrences in Inyo County (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave, Monolith, or 10 adjacent quads. The closest CNDDB record is from 1995, approximately 87 mi northeast of the BSA on the Panamint quad.

HABITAT PRESENT IN THE BSA: Marginal habitat for this species occurs in the BSA. The BSA is located outside the known geographic range of this species (CNPS 2010).

DISCUSSION: Panamint Mountains lupine was not observed in the BSA during the botanical inventory conducted during the evident and identifiable period. *Lupinus bicolor*, *L. concinnus*, *L. excubitus* var. *austromontanus*, *Lupinus microcarpus* var. *horizontalis*, and *L. microcarpus* var. *microcarpus* were observed in the BSA. No other species of *Lupinus* were observed in the BSA.

Calico monkeyflower (*Mimulus pictus*)

HABITAT AND BIOLOGY: An annual herb found on disturbed or granitic substrates in broadleaved upland forest and cismontane woodland from 300 to 4,300 ft. Blooms March through May (CNPS 2010).

RANGE: In CA, known from Kern and Tulare counties (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave or Monolith quads. The closest CNDDB record is from 1993, approximately 5.6 mi northwest of the BSA on the Tehachapi Northeast quad.

HABITAT PRESENT IN THE BSA: Marginal habitat for this species occurs in the BSA.

DISCUSSION: Calico monkeyflower was not observed in the BSA during the botanical inventory conducted during the evident and identifiable period. No species of *Mimulus* were observed in the BSA.

Kelso Creek monkeyflower (*Mimulus shevockii*)

HABITAT AND BIOLOGY: An annual herb found on metamorphic, sandy, or gravelly substrates in pinyon and juniper woodland and Joshua tree woodland from 2,625 to 4,400 ft. Blooms March through May (CNPS 2010).

RANGE: In CA, known from about ten occurrences in Kern County (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave, Monolith, or 10 adjacent quads. The closest CNDDB record is from 2008, approximately 19.7 mi north of the BSA on the Pinyon Mtn. quad.

HABITAT PRESENT IN THE BSA: Habitat for this species occurs in the BSA.

DISCUSSION: Kelso Creek monkeyflower was not observed in the BSA during the botanical inventory conducted during the evident and identifiable period. No species of *Mimulus* were observed in the BSA.

Flax-like (=Tehachapi) monardella (*Monardella linoides* ssp. *oblonga*)

HABITAT AND BIOLOGY: A rhizomatous herb found in upper and lower montane coniferous forest and pinyon and juniper woodland from 2,950 to 8,100 ft. Blooms June through August (CNPS 2010).

RANGE: In CA, known from Kern, Tulare, and Ventura counties (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave or Monolith quads. The closest CNDDB record is from 1889, approximately 10.4 mi west of the BSA on the Tehachapi South quad.

HABITAT PRESENT IN THE BSA: Habitat for this species occurs in the BSA.

DISCUSSION: The published blooming period for this species is June through August (CNPS 2010). Because the May 2010 surveys were conducted outside its published blooming period, it is recommended that surveys be conducted for this species in late summer 2010. No species of *Monardella* were observed in the BSA during the May 2010 botanical surveys.

Bakersfield cactus (*Opuntia basilaris* var. *treleasei*)

HABITAT AND BIOLOGY: A stem succulent found in chenopod scrub, cismontane woodland, and Valley and foothill grassland from 400 to 1,800 ft. Blooms April through May (CNPS 2010).

RANGE: In CA, known from Kern County (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave, Monolith, or 10 adjacent quads. The closest CNDDB record is from 1989, approximately 21.8 mi northwest of the BSA on the Oiler Peak quad.

HABITAT PRESENT IN THE BSA: Habitat for this species occurs in the BSA.

DISCUSSION: Bakersfield cactus was not observed in the BSA during the botanical inventory conducted during the evident and identifiable period. *Opuntia basilaris* var. *basilaris* was observed in the BSA. No other varieties of *Opuntia basilaris* were observed in the BSA.

Cushenbury oxytheca (*Oxytheca parishii* var. *goodmaniana*)

HABITAT AND BIOLOGY: An annual herb found in pinyon and juniper woodland on sandy, carbonate substrate from 4,000 to 7,800. Blooms May to October (CNPS 2010).

RANGE: In CA, known from 15 occurrences in San Bernardino County (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave, Monolith, or 10 adjacent quads. The closest CNDDB record is from 2005, approximately 83 mi southeast of the BSA on the Butler Creek quad.

HABITAT PRESENT IN THE BSA: Marginal habitat for this species occurs in the BSA. The BSA is located outside the known geographic range of this species (CNPS 2010).

DISCUSSION: Cushenbury oxytheca was not observed in the BSA during the botanical inventory conducted during the evident and identifiable period. *Oxytheca perfoliata* was observed in the BSA. No other species of *Oxytheca* were observed in the BSA.

Death Valley sandpaper plant (*Petalonyx thurberi* ssp. *gilmanii*)

HABITAT AND BIOLOGY: An evergreen shrub found in desert dunes and Mojavean desert scrub from 850 to 4,750 ft. Blooms May through September (CNPS 2010).

RANGE: In CA, known from fewer than 20 occurrences in Inyo and San Bernardino counties (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave, Monolith, or 10 adjacent quads. The closest CNDDB record is from 1986, approximately 82 mi northeast of the BSA on the Maturango Peak Southeast quad.

HABITAT PRESENT IN THE BSA: Marginal habitat for this species occurs in the BSA. The BSA is located outside the known geographic range of this species (CNPS 2010).

DISCUSSION: Death Valley sandpaper plant was not observed in the BSA during the botanical inventory conducted during the evident and identifiable period. *Petalonyx thurberi* ssp. *thurberi* was observed in the BSA. No other species of *Petalonyx* were observed in the BSA.

Adobe yampah (*Perideridia pringlei*)

HABITAT AND BIOLOGY: A perennial herb found in chaparral, cismontane woodland, coastal scrub, and pinyon and juniper woodland from 985 to 5,900 ft. Blooms April through June (CNPS 2010).

RANGE: In CA, known from Kern, Los Angeles, Monterey, Santa Barbara, San Luis Obispo, Tulare, and Ventura counties (CNPS 2010).

KNOWN RECORDS: No CNDDB records exist for this species because does not track CNPS List 4 species in their database.

HABITAT PRESENT IN THE BSA: Habitat for this species occurs in the BSA.

DISCUSSION: A species of *Perideridia* was observed in the BSA during botanical surveys conducted from 2 to 7 May 2010. However, the identity of this species could not be verified because the plants were not yet in flower or fruit. A follow-up site visit was conducted on 10 June 2010 to collect the species in fruit. Approximately 30 to 40 individuals were observed on 10 June 2010 near the southwest corner of the BSA (Figure 4, Sheet 2 of 8). Although the fruits were still not completely mature, based on examination of the available fruits and herbarium specimens of species that occur in the region, the species was determined to be *P. pringlei*, a CNPS list 4.3 species. A CNDDB Field Form for this species is in Appendix I.

Round-leaved phacelia (*Phacelia mustelina*)

HABITAT AND BIOLOGY: An annual herb found in carbonate or volcanic, gravelly or rocky Mojavean desert scrub and pinyon and juniper woodland from 2,400 to 8,600 ft. Blooms May through July (CNPS 2010).

RANGE: In CA, known from fewer than 20 occurrences in Inyo and San Bernardino counties (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave, Monolith, or 10 adjacent quads. The closest CNDDB record is from 1998, approximately 57.8 mi northeast of the BSA on the Pilot Knob quad.

HABITAT PRESENT IN THE BSA: Marginal habitat for this species occurs in the BSA. The BSA is located outside the known geographic range of this species (CNPS 2010).

DISCUSSION: Round-leaved phacelia was not observed in the BSA during the botanical inventory conducted during the evident and identifiable period. *Phacelia distans*, *P.* cf. *fremontii*, and *P. imbricata* ssp. *imbricata* were observed in the BSA. No other species of *Phacelia* were observed in the BSA.

Charlotte's phacelia (*Phacelia nashiana*)

HABITAT AND BIOLOGY: An annual herb found on granitic or sandy substrates in Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodland from 1,900 to 7,300 ft. Blooms March through June (CNPS 2010).

RANGE: In CA, known from Inyo, Kern, and Tulare counties (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave or Monolith quads. The closest CNDDB record is from 1988, approximately 6.3 mi northeast of the BSA on the Mojave Northeast quad.

HABITAT PRESENT IN THE BSA: Habitat for this species occurs in the BSA.

DISCUSSION: Charlotte's phacelia was not observed in the BSA during the botanical inventory conducted during the evident and identifiable period. *Phacelia distans*, *P.* cf. *fremontii*, and *P. imbricata* ssp. *imbricata* were observed in the BSA. No other species of *Phacelia* were observed in the BSA.

Piute Mountains jewel-flower (*Streptanthus cordatus* var. *piutensis*)

HABITAT AND BIOLOGY: A perennial herb found on clay or metamorphic substrates in broadleaved upland forest, closed-cone coniferous forest, and pinyon and juniper woodland from 3,500 to 5,700 ft. Blooms May through July (CNPS 2010).

RANGE: In CA, known from fewer than five occurrences in Kern County (CNPS 2010).

KNOWN RECORDS: There are no CNDDB records for this species on the Mojave or Monolith quads. The closest CNDDB record is from 1966, approximately 3.7 mi northeast of the BSA on the Cache Peak quad.

HABITAT PRESENT IN THE BSA: Habitat for this species occurs in the BSA.

DISCUSSION: Piute Mountains jewel-flower was not observed in the BSA during the botanical inventory conducted during the evident and identifiable period. No species of *Streptanthus* were observed in the BSA.

Golden violet (*Viola aurea*)

HABITAT AND BIOLOGY: A perennial herb found on sandy substrates in Great Basin scrub and pinyon and juniper woodland from 3,200 to 6,700 ft. Blooms April through June (CNPS 2010).

RANGE: In CA, known from Kern, Lassen, Los Angeles, Mono, San Bernardino, San Diego, and Sierra counties (CNPS 2010). This species is also known to occur in Nevada (CNPS 2010).

KNOWN RECORDS: The closest CNDDB record is located approximately 1.8 mi southeast of the BSA on the Mojave quad. The only source of information for this occurrence is the site name noted by Milo Baker in "Studies in Western Violets" in Madroño, Vol. 12, 1953.

HABITAT PRESENT IN THE BSA: Habitat for this species occurs in the BSA.

DISCUSSION: Golden violet was not observed in the BSA during the botanical inventory conducted during the evident and identifiable period. No species of *Viola* were observed in the BSA. (Note: *Viola aurea* is treated as a subspecies of *V. purpurea* in the *Second Edition of The Jepson Manual*; Little 2010).

D. Evaluation of Special-Status Natural Communities

Two biological communities in the BSA, Joshua tree woodland (432.35 ac) and Scale broom scrub (0.62 ac), have a state rarity ranking of S3. The CNDDB considers communities with state rarity rankings of S1-S3 to be of "high inventory priority" (DFG 2009a). A community with an S3 ranking is considered "rare and threatened" throughout its range by Sawyer et al. (2009). No other special-status communities occur in the BSA.

E. Summary of Findings

Joshua tree woodland (432.35 ac) and Scale broom scrub (0.62 ac), are the only special-status communities in the BSA. The BSA provides suitable habitat for 27 special-status plant species. No federal or state listed species or BLM sensitive species were observed. A population of *Perideridia pringlei*, a CNPS list 4.3 species, was observed in the southwest corner of the BSA. No other special-status plant species were observed in the BSA. Because the May 2010 surveys were conducted outside the published blooming period of *Monardella linoides* ssp. *oblonga* and *Erigeron aequifolius*, it is recommended that surveys be conducted for them in late summer 2010.

VI. LITERATURE CITED AND PERSONAL COMMUNICATIONS

A. Literature Cited

Abrams, L. 1923, 1944, 1951, 1960. Illustrated flora of the Pacific states. Stanford University Press, Stanford, CA.

Baldwin, B. G., S. Boyd, B. J. Ertter, R. W. Patterson, T. J. Rosatti, and D. H. Wilken, eds. 2002. The Jepson desert manual: Vascular plants of Southeastern California. University of California Press, Berkeley, CA.

Bureau of Land Management (BLM). 2009. Survey protocols required for NEPA/ESA compliance for BLM special status plant species.

Bureau of Land Management (BLM). Accessed June 2010. Special status plants of the Ridgecrest Field Office. http://www.blm.gov/ca/pa/ssp/fo/ridssp.htm.

California Department of Fish and Game (DFG). 28 December 2009 (2009a). List of California Vegetation Alliances. Biogeographic Data Branch, CNDDB, Sacramento, CA.

California Department of Fish and Game (DFG). May 2009 (2009b). Guidelines for assessing the effects of proposed projects on rare, threatened, and endangered plants and natural communities. Sacramento, CA. http://www.dfg.ca.gov/bdb/pdfs/guideplt.pdf.

California Department of Fish and Game (DFG). April 2010 (2010a). Special vascular plants, bryophytes, and lichens list. Habitat Conservation Division, CNDDB, Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/SPPlants.pdf

California Department of Fish and Game (DFG). April 2010 (2010b). State and federally listed endangered, threatened, and rare plants of California. Habitat Conservation Division, CNDDB, Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/TEPlants.pdf

California Department of Fish and Game (DFG). 1 May 2010 (2010c). CNDDB/ RareFind: Mojave, Monolith, and 10 adjacent quadrangles. Natural Heritage Division, CNDDB, Sacramento, CA.

California Department of Water Resources (CDWR), Division of Flood Management. Accessed 2 June 2010 (2009a). Precipitation/ Snow information. http://cdec.water.ca.gov/cgi-progs/profile?s=THH&type=precip

>California Native Plant Society (CNPS). 2 June 2001. Botanical survey guidelines of the California Native Plant Society. 9 December 1983 / Revised 2 June 2001.

California Native Plant Society (CNPS). Accessed May and June 2010. Inventory of rare and endangered plants (Version 7-10b 4-21-10). California Native Plant Society, Sacramento, CA. http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi

CalPhotos. Accessed May and June 2010. CalPhotos, plant images. http://calphotos.berkeley.edu//flora/

Consortium of California Herbaria (CCH). Accessed June 2010. Accession results for various species. http://ucjeps.berkeley.edu/consortium/.

Hickman, J., ed. 1993. The Jepson manual: Higher plants of California. University of California Press, Berkeley, CA.

Jaeger, E. C. 1969. Desert wild flowers. Stanford University Press, Stanford, CA.

Jepson Flora Project. Accessed 1 June 2010. Jepson Online Interchange for California floristics: *Eschscholzia minutiflora* and subspecies. http://ucjeps.berkeley.edu/cgi-bin/get_cpn.pl?50498&expand=1.

Little, R. J. 2010. Violaceae, Violet family. Second ed. of the Jepson Manual, online treatment. http://ucjeps.berkeley.edu/tjm2/review/treatments/violaceae.html#48214

Munz, P. 1959. A California flora. University of California Press, Berkeley, CA.

Munz, P. 1974. A flora of southern California. University of California Press, Berkeley, CA.

Natural Resources Conservation Service (NRCS). Accessed 2 June 2010. Official soil series descriptions (OSD) for various soil series. Soil Survey Staff, United States Department of Agriculture. http://ortho.ftw.nrcs.usda.gov/cgi-bin/osd/osdname.cgi.

Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. A manual of California vegetation, 2nd ed. California Native Plant Society, Sacramento, CA.

Simpson, M. and K. Hasenstab. 2009. *Cryptantha* of southern California. Crossosoma 35:1-59.

U.S. Fish and Wildlife Service (USFWS). 1996. Guidelines for conducting and reporting botanical inventories for federally listed, proposed and candidate plants. Sacramento Fish and Wildlife Office, Sacramento, CA. http://sacramento.fws.gov/es/documents/Listed_plant_survey_guidelines.pdf.

U.S. Fish and Wildlife Service (USFWS). Accessed 1 June 2010. List of federally listed threatened & endangered species which may occur in Kern, Los Angeles, and San Bernardino counties, CA. USFWS, Ventura Fish and Wildlife Office, Ventura, CA. http://www.fws.gov/ventura/speciesinfo/.

B. Personal Communications

Ms. Bridget Canty. Assoc. Project Manager & Ecologist. CH2M HILL. April 2010. Phone conversations and email correspondence regarding various project details.

Ms. Cheryl Casdorph. Supervising Planner. Kern County Planning Department, Special Projects Division. 2 June 2009. Phone conversation regarding whether Kern County maintains a list of plant species of local concern.

VII. PREPARERS

R. John Little, Ph.D., Botany, Claremont Graduate School, Claremont, CA. Over 25 years experience managing and conducting environmental projects involving impact assessment and preparation of numerous NEPA/CEQA compliance documents, Biological Assessments, and Caltrans Natural Environmental Studies. Experience includes conducting special-status plant and wildlife species surveys, jurisdictional wetland delineations, general biological surveys, permitting and biological report preparation. Dr. Little is a trained wetland delineator, an ISA Certified Arborist (WE-1057A), and holds a California Department of Fish and Game Scientific Collecting Permit (#801073-04), and DFG Rare, Threatened and Endangered Plant Voucher Collecting Permit (#09054).
Responsibilities: Project Manager, senior technical lead, report preparation, and botanical inventory fieldwork, plant identification.

Chuck Hughes, M.S., Plant Biology, Michigan State University, East Lansing, MI. Prepares biological/botanical resource evaluations, jurisdictional delineations, arborist reports, impact analyses, and mitigation and restoration plans. Serves as assistant project manager. He is an ISA Certified Arborist (WE-6885A) and is listed on a Fish and Wildlife Service recovery permit for vernal pool crustaceans (TE799564-2). He holds a California Department of Fish and Game Rare, Threatened and Endangered Plant Voucher Collecting Permit (#08053), and a DFG Scientific Collecting Permit (#801246-05).
Responsibilities: Botanical survey fieldwork, plant identification, and botanical report preparation.

Michael Bower, M.S., Ecology, University of California, Davis, CA. Conducts plant and wildlife surveys, provides technical support for wetland delineations, biological resource evaluations, mitigation plans, and other documents used in the CEQA/NEPA process, queries the California Natural Diversity Database (CNDDB/ RareFind), and researches special-status species for projects. He holds a California Department of Fish and Game Rare, Threatened and Endangered Plant Voucher Collecting Permit (#2081(a)-09-14-V).
Responsibilities: Botanical survey fieldwork, plant identification, and botanical report preparation.

Adam C. Forbes, M.S., Range Science (emphasis on plant systematics), New Mexico State University, Las Cruces, NM. Over 10 years experience conducting biological studies for the public and private sector. As a botanist/ biologist with Sycamore Environmental, Mr. Forbes conducts plant and wildlife surveys, prepares and edits reports, serves as assistant project manager, and conducts informal consultations with regulatory agency personnel. Responsibilities also include assisting with proposal preparation and marketing activities. Provides technical support for wetland delineations, biological resource evaluations, mitigation plans, and other documents used in the CEQA/NEPA process. He holds a California Department of Fish and Game Rare, Threatened and Endangered Plant Voucher Collecting Permit (#10021), and a DFG Scientific Collecting Permit (#802060-04).
Responsibilities: Botanical report preparation.

Aramis Respall. Over 15 years experience in drafting and design for public and private projects using Autodesk land development and ESRI ArcGIS geospatial programs. Primary experience evolved from conventional surveying and civil engineering practices to advanced GPS and GIS based technology. Past project experience includes CAD/GIS support for road and highway designs, facilities management, highway and airport master planning, noise studies, power transmission line alignments, and various private development projects such as subdivision layouts and golf courses. Prepares figures for biological and permitting documents such as project location maps, aerial photographs, biological resource maps, CNDDB proximity maps, delineation of wetlands and other waters, calculation of proposed project impacts, tree location maps, and other supporting graphics. Provides geospatial analysis and support for projects involving hydrology, watershed studies, project impact analysis, CNDDB species, critical habitat and mitigation.
Responsibilities: Figure preparation and spatial analysis.

Jessica Easley, B.S., Wildlife Biology, University of Montana, College of Forestry and Conservation, Missoula, MT. Conducts plant and wildlife surveys, provides technical support for wetland delineations, biological resource evaluations, mitigation plans, and other documents used in the CEQA/NEPA process, queries the California Natural Diversity Database (CNDDB/ RareFind), and researches special-status species for projects. She is an ISA Certified Arborist (WE-7845A), holds a California Department of Fish and Game Scientific Collecting Permit (#801180-02), and a DFG Rare, Threatened and Endangered Plant Voucher Collecting Permit (#2081(a)-10-06-V). Attended California red-legged frog (*Rana draytonii*) training (Mar 2009) and California tiger salamander (*Ambystoma californiense*) training (Mar 2010) at the Elkhorn Slough National Estuarine Research Reserve, Monterey County, CA.
Responsibilities: Botanical report preparation.

Cynthia Little, Principal, Sycamore Environmental.
Responsibilities: Senior editor, quality control.

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APPENDIX A.

Plant Species Observed

Sun Creek Wind Project
Kern County, CA

Family	Scientific Name	Common Name	Native/ Introduced [1]
GYMNOSPERMS			
Cupressaceae	*Juniperus californica*	California juniper	N
Ephedraceae	*Ephedra viridis*	Mountain ephedra	N
DICOTS			
Apiaceae	*Lomatium mohavense*		N
	Perideridia pringlei	Pringle's yampah	N
Asteraceae	*Acamptopappus sphaerocephalus* var. *hirtellus*	Goldenhead	N
	Ambrosia dumosa	Burro-weed	N
	Ambrosia sp.	Ragweed	--
	Anisocoma acaulis	Scale bud	N
	Artemisia sp.	Sagebrush	--
	Calycoseris parryi	Calycoseris	N
	Chaenactis fremontii	Desert pincushion	N
	Chaenactis stevioides	Desert pincushion	N
	Chaenactis xantiana	Pincushion	N
	Chrysothamnus sp.	Rabbitbrush	N
	Coreopsis bigelovii	Tickseed	N
	Coreopsis calliopsidea	Tickseed	N
	Encelia actoni	Encelia	N
	Ericameria cooperi		N
	Ericameria linearifolia	Interior goldenbush	N
	Eriophyllum pringlei	Woolly sunflower	N
	Eriophyllum wallacei	Woolly sunflower	N
	Hymenoclea salsola	Burrobrush	N
	Lasthenia gracilis	Goldfields	N
	Layia glandulosa	White layia	N
	Lepidospartum squamatum	Scale-broom	N
	Madia elegans	Common madia	N
	Malacothrix coulteri	Snake's-head	N
	Malacothrix glabrata	Desert dandelion	N
	Monolopia lanceolata		N
	Stephanomeria exigua		N
	Stephanomeria sp.		N
	Stylocline gnaphaloides	Everlasting nest straw	N
	Syntrichopappus fremontii		N
	Tetradymia stenolepis	Cotton-thorn	N
	Uropappus lindleyi	Silver puffs	N
	Xylorhiza tortifolia var. *tortifolia*	Mojave aster	N

Boraginaceae	*Amsinckia tessellata* var. *tessellata*	Devil's lettuce	N
	Cryptantha decipiens		N
	Cryptantha micrantha		N
	Cryptantha mohavensis	Mojave cryptantha	N
	Cryptantha nevadensis		N
	Cryptantha pterocarya		N
	Pectocarya setosa	Pectocarya	N
	Pectocarya linearis ssp. *ferucola*	Pectocarya	N
	Pectocarya penicillata	Pectocarya	N
	Plagiobothrys arizonicus	Popcornflower	N
Brassicaceae	*Brassica tournefortii*	Sahara mustard	I
	Guillenia lasiophylla	California mustard	N
	Arabis pulchra var. *pulchra*	Rock cress	N
	Caulanthus coulteri var. *coulteri*	Jewelflower	N
	Caulanthus inflatus	Desert candle	N
	Descurainia sophia	Tansy mustard	I
	Descurainia sp.		--
	Erysimum capitatum var. *capitatum*	Western wallflower	N
	Lepidium flavum var. *flavum*	Peppergrass	N
	Lepidium fremontii var. *fremontii*	Peppergrass	N
	Lepidium nitidum var. *nitidum*	Peppergrass	N
	Sisymbrium altissimum	Tumble mustard	I
	Stanleya pinnata var. *pinnata*	Prince's plume	N
	Tropidocarpum gracile	Tropidocarpum	N
Cactaceae	*Opuntia basilaris* var. *basilaris*	Beavertail	N
	Opuntia echinocarpa	Silver cholla	N
Capparaceae	*Isomeris arborea*	Bladderpod	N
Chenopodiaceae	*Atriplex canescens*	Fourwing saltbush	N
	Grayia spinosa	Hop-sage	N
	Krascheninnikovia lanata	Winter fat	N
Cucurbitaceae	*Marah fabaceus*	California man-root	N
Cuscutaceae	*Cuscuta* sp.	Dodder	N
Euphorbiaceae	*Chamaesyce albomarginata*	Rattlesnake weed	N
	Eremocarpus setigerus	Turkey mullein	N
Fabaceae	*Astragalus didymocarpus* var. *didymocarpus*	Two-seeded milkvetch	N
	Astragalus pachypus var. *pachypus*	Astragalus	N
	Astragalus purshii var. *tinctus*	Astragalus	N
	Lotus humistratus	Lotus	N
	Lupinus bicolor	Miniature lupine	N
	Lupinus concinnus	Bajada lupine	N
	Lupinus excubitus var. *austromontanus*	Grape soda lupine	N
	Lupinus microcarpus var. *horizontalis*	Chick lupine	N
	Lupinus microcarpus var. *microcarpus*	Chick lupine	N
	Trifolium gracilentum var. *gracilentum*	Clover	N
Geraniaceae	*Erodium cicutarium*	Filaree	I
Hydrophyllaceae	*Emmenanthe pendulifera* var. *pendulifera*	Whispering bells	N
	Eucrypta micrantha		N
	Nama demissum var. *demissum*	Purple mat	N
	Phacelia distans		N

	Phacelia cf. *fremontii*		N
	Phacelia imbricata ssp. *imbricata*		N
	Pholistoma membranaceum	White fiesta flower	N
	Tricardia watsonii	Three hearts	N
Lamiaceae	*Salazaria mexicana*	Mexican bladdersage	N
	Salvia columbariae	Chia	N
	Salvia dorrii var. *pilosa*	Hairy sage	N
Loasaceae	*Mentzelia albicaulis*	Blazing star	N
	Mentzelia veatchiana	Blazing star	N
	Petalonyx thurberi ssp. *thurberi*	Thurber's sandpaper plant	N
Malvaceae	*Eremalche exilis*		N
	Sphaeralcea ambigua var. *rugosa*	Desert globemallow	N
Nyctaginaceae	*Mirabilis californica*	Wishbone bush	N
	Mirabilis bigelovii var. *retrorsa*		N
Onagraceae	*Camissonia campestris* ssp. *campestris*	Mojave sun cup	N
	Camissonia claviformis ssp. *claviformis*	Sun cup	N
	Camissonia pallida ssp. *hallii*	Sun cup	N
	Camissonia palmeri	Sun cup	N
	Camissonia sp.	Sun cup	N
Papaveraceae	*Eschscholzia minutiflora* ssp. *covillei* [2]	Coville's poppy	N
	Platystemon californicus	Cream cups	N
	Stylomecon heterophylla	Wind poppy	N
Plantaginaceae	*Plantago* sp.	Plantain	N
Polemoniaceae	*Eriastrum densifolium* ssp. *mohavense*	Mojave eriastrum	N
	Eriastrum diffusum		N
	Gilia breccianum ssp. *neglecta*		N
	Gilia sp.		N
	Gilia capitata ssp. *abrotanifolia*		N
	Linanthus sp.		N
	Loeseliastrum matthewsii	Desert calico	N
	Loeseliastrum schottii	Schott gilia	N
Polygonaceae	*Centrostegia thurberi*	Thurber spiny herb	N
	Chorizanthe brevicornu	Brittle spineflower	N
	Chorizanthe watsonii	Watson's spineflower	N
	Eriogonum angulosum	Wild buckwheat	N
	Eriogonum fasciculatum var. *polifolium*	California buckwheat	N
	Eriogonum gracillimum	Wild buckwheat	N
	Eriogonum nudum var. *westonii*	Wild buckwheat	N
	Eriogonum pusillum	Wild buckwheat	N
	Eriogonum reniforme	Wild buckwheat	N
	Eriogonum trichopes	Wild buckwheat	N
	Eriogonum viridescens	Wild buckwheat	
	Eriogonum sp. [3]	Wild buckwheat	N
	Oxytheca perfoliata		N
	Rumex hymenosepalus	Canaigre	N
Portulacaceae	*Calandrinia ciliata*	Red maids	N
	Calyptridium monandrum	Pussypaws	N
	Claytonia parviflora ssp. *parviflora*	Miner's lettuce	N
Ranunculaceae	*Delphinium parishii* ssp. *parishii*	Parish's larkspur	N
Rosaceae	*Purshia tridentata* var. *glandulosa*	Antelope Brush	N

Rubiaceae	*Galium* sp.	Bedstraw	N
Scrophulariaceae	*Castilleja angustifolia*	Desert Paintbrush	N
	Penstemon cf. *speciosus*	Royal Beardtongue	N
Solanaceae	*Datura wrightii*	Jimson weed	N
	Lycium andersonii	Box thorn	N
	Lycium cooperi	Box thorn	N
Tamaricaceae	*Tamarix aphylla*	Athel	I
	Tamarix parviflora	Smallflower tamarisk	I
Zygophyllaceae	*Larrea tridentata*	Creosote bush	N
MONOCOTS			
Liliaceae	*Allium fimbriatum* var. *fimbriatum*	Onion	N
	Calochortus kennedyi var. *kennedyi*	Desert mariposa lily	N
	Dichelostemma capitatum ssp. *capitatum*	Blue dicks	N
	Muilla maritima	Common muilla	N
	Yucca breviflora	Joshua tree	N
	Yucca whipplei	Chaparral yucca	N
Poaceae	*Achnatherum hymenoides*	Indian ricegrass	N
	Achnatherum lemmonii var. *lemmonii*	Lemmon's needlegrass	N
	Achnatherum speciosum	Desert needlegrass	N
	Avena sp.	Wild oat	I
	Bromus arenarius	Australian chess	I
	Bromus diandrus	Ripgut grass	I
	Bromus madritensis ssp. *rubens*	Foxtail chess	I
	Bromus tectorum	Cheat grass	I
	Elymus elymoides	Squirreltail	N
	Hordeum murinum ssp. *leporinum*	Foxtail	I
	Poa secunda ssp. *juncifolia*	Bluegrass	N
	Schismus barbatus	Mediterranean grass	I
	Vulpia microstachys var. *pauciflora*	Vulpia	N

[1] N = Native; I= Introduced; -- = Unable to determine.

[2] C. Clark (in Hickman, ed. 1993) stated under the description of *Eschscholzia minutiflora* that *E. minutiflora* plants with petals 6-18 mm long and 2n=24 from western Mojave Desert (NE Kern Co.) have been called ssp. *covillei* (E. Greene) C. Clark, whereas *E. minutiflora* plants with petals 10-26 mm and 2n=12 from northeast Kern County in the western portion of the Mojave Desert have been called ssp. *twisselmannii* (C. Clark & Faull). Petal lengths of plants from the BSA fall in the range of ssp. *covillei*. However, as noted in the Jepson Flora Project (Jepson Flora Project 2010) the current status of ssp. *covillei* and ssp. *twisselmannii* remain unresolved.

[3] This perennial shrub was not in flower, but its inflorescence type was determined from the previous year's growth. Morphological characteristics observed in collected specimens and our photographs of it confirm that this shrub is not one of three special-status species that could occur in the BSA: *Eriogonum kennedyi* var. *pinicola, E. ovalifolium* var. *vineum*, or *E. contiguum*. See text and Appendix H.

APPENDIX B.

CNPS Data Sheets

Sun Creek Wind Project
Kern County, CA

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CALIFORNIA NATIVE PLANT SOCIETY - VEGETATION RAPID ASSESSMENT FIELD FORM

(Desert Version Revised Feb 21, 2007)

For Office Use:	Final database #:	Final vegetation type name:	Alliance Association

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #:	Air photo #:	Date:	Name(s) of surveyors:
1		6 May 2010	Chuck Hughes

GPS waypoint #: _____ GPS name: _____ GPS datum: (e.g. NAD 83) WGS 84 Zone: 10S / 10T / (11S) (circle one)

UTM field reading: UTME 386812 UTMN 3883417 GPS Error: ± 0.8 ft / (m)

Is GPS within stand? (Yes) / No If No, cite from GPS point to stand, the distance _____(in meters) and bearing _____(degrees)

Elevation: 3,670 (ft) m Photograph #'s:

Geology code: MIAL Soil Texture code: MESA | (Upland) or Wetland/Riparian (circle one)

Topography: Macro: top upper (mid) lower bottom | Micro: convex flat concave (undulating) (circle one)

% Surface cover: Lg rock: 0 (>25 cm diam) Sm rock: 25 (2mm-25 cm diam) Bare/Fine: 68 (<2 mm, Incl sand, mud) Litter: 5 BA Stems: 2 Water: 0 =sums to100%

Slope exposure, Actual °: _____ General: (NE) NW SE SW Flat Variable /All (circle one)

Slope steepness, Actual °: _____ General: 0° 1-5° (5-25°) > 25° (circle one)

Size of stand: <1 acre___ 1-5 acres___ >5 acres X Plot (Yes) No If yes, denote size: 100 m² / (400m²) / 1000 m² / Other

Site history, stand age, and comments: _____

Type/ Level of disturbance codes: 02 / L 05 / S ____/___ ____/___ ____/___ "Other"

II. HABITAT AND VEGETATION DESCRIPTION

Tree DBH : T1 (<1" dbh), T2 (1-6" dbh), T3 (6-11" dbh), T4 (11-24" dbh), T5 (>24" dbh), T6 (multi-layered) (circle one)

If Tree, list 1-3 dominant overstory spp.: _____

Shrub: S1 seedling (<3 yr. old), S2 young (<1% dead), S3 mature (1-25% dead), (S4 decadent (>25% dead))

(Herbaceous: H1 (<12" plant ht.)) H2 (>12" ht.) Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), 2 (2-10ft. ht.), 3 (10-20ft. ht.), 4 (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), 2 (1.5-6" diam.), (3 (>6" diam.)) % NonVasc cover: 0 Total % Veg cover: 69

% Cover -Overstory Tree Conifer/Hardwood: ____/ 1 Understory tree-Tall shrub: 3 Shrub: 5 Herbaceous: 60

Height Class - Overstory Conifer/Hardwood: ____/ 04 Understory tree-Tall shrub: 03 Shrub: 02 Herbaceous: 01

Height classes: 01=<1/2m 02=1/2-1m 03=1-2m 04=2-5m 05=5-10m 06=10-15m 07=15-20m 08=20-35m 09=35-50m 10=>50m

Species (List up to 20 major species), Stratum, and Approximate % cover: Stratum categories: T= Overstory tree, U= Understory tree S = Shrub, H= Herb, N= Non-vascular. *% cover intervals for reference*: <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Strata	Species	% cover		Strata	Species	% cover
O	*Yucca brevifolia*	1		H	*Lepidium nitidum* var. *nitidum*	3
U	*Juniperus californica*	3		H	*Achmatherum* sp.	1
S	*Ericameria cooperi*	2		H	*Amsinckia tessellata*	1
S	*Ephedra viridis*	2		H	*Poa* sp.	1
S	*Eriogonum fasciculatum*	1		H	*Sphaeralcea ambigua*	<1
H	*Bromus madritensis*	30		H	*Elymus* sp.	<1
H	*Erodium cicutarium*	20		H	*Mentzelia* sp.	<1
H	*Chamaesyce albomarginata*	2				

Unusual species: _____

III. INTERPRETATION OF STAND

Field-assessed vegetation alliance name: *Juniperus californica* woodland

Field-assessed association name (optional): _____

Adjacent alliances: _____ / _____

Confidence in alliance identification: L (M) H Explain: *Yucca brevifolia* generally taller but with less cover.

Other identification problems: _____

Has the vegetation changed since air photo taken? Yes / No If Yes, What has changed?

Polygon is more than one type: (Yes, No) _____ (Note: type with greatest coverage in polygon should be entered in above section)

Other types: _____

CALIFORNIA NATIVE PLANT SOCIETY - VEGETATION RAPID ASSESSMENT FIELD FORM

(Desert Version Revised Feb 21, 2007)

For Office Use:	Final database #:	Final vegetation type name:	Alliance Association

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #:	Air photo #:	Date:	Name(s) of surveyors:
2		6 May 2010	Chuck Hughes

GPS waypoint #: _____ GPS name: _____ GPS datum: (e.g. NAD 83) WGS 84 Zone: 10S / 10T / (11S) (circle one)

UTM field reading: UTME 386399 _____ UTMN 3882960 _____ GPS Error: ± 1.3 ft / (m)

Is GPS within stand? (Yes) / No If No, cite from GPS point to stand, the distance _____(in meters) and bearing _____(degrees)

Elevation: 3,690 (ft) m Photograph #'s:

Geology code: MIAL Soil Texture code: MESA | Upland or Wetland/Riparian (circle one)

Topography: Macro: top upper (mid) lower bottom | Micro: convex flat concave (undulating) (circle one)

% Surface cover: Lg rock: 0 (>25 cm diam) Sm rock: 20 (2mm-25 cm diam) Bare/Fine: 73 (<2 mm, Incl sand, mud) Litter: 5 BA Stems: 2 Water: 0 =sums to100%

Slope exposure, Actual °: _____ General: NE NW (SE) SW Flat Variable /All (circle one)

Slope steepness, Actual °: _____ General: 0° 1-5° (5-25°) > 25° (circle one)

Size of stand: <1 acre___ 1-5 acres___ >5 acres X Plot: (Yes) No If yes, denote size: 100 m² / (400m²) / 1000 m² / Other

Site history, stand age, and comments: _____

Type/ Level of disturbance codes: 02 / L 05 / S ____/___ ____/___ ____/___ "Other"

II. HABITAT AND VEGETATION DESCRIPTION

Tree DBH : T1 (<1" dbh), T2 (1-6" dbh), T3 (6-11" dbh), T4 (11-24" dbh), T5 (>24" dbh), T6 (multi-layered) (circle one)

If Tree, list 1-3 dominant overstory spp.: _____

Shrub: S1 seedling (<3 yr. old), S2 young (<1% dead), S3 mature (1-25% dead), (S4 decadent (>25% dead))

Herbaceous: H1 (<12" plant ht.), (H2 (>12" ht.)) Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), 2 (2-10ft. ht.), 3 (10-20ft. ht.), 4 (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), 2 (1.5-6" diam.), 3 (>6" diam.) % NonVasc cover: 0 Total % Veg cover: 75

% Cover -Overstory Tree Conifer/Hardwood: ____/____ Understory tree-Tall shrub: ____ Shrub: 5 Herbaceous: 70

Height Class - Overstory Conifer/Hardwood: ____/____ Understory tree-Tall shrub: ____ Shrub: 02 Herbaceous: 01

Height classes: 01=<1/2m 02=1/2-1m 03=1-2m 04=2-5m 05=5-10m 06=10-15m 07=15-20m 08=20-35m 09=35-50m 10=>50m

Species (List up to 20 major species), Stratum, and Approximate % cover: Stratum categories: T= Overstory tree, U= Understory tree S = Shrub, H= Herb, N= Non-vascular. *% cover intervals for reference*: <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Strata	Species	% cover		Strata	Species	% cover
S	*Encelia actoni*	4		H	*Gilia* sp.	<1
S	*Eriogonum fasciculatum*	1		H	*Platystemon californicus*	<1
H	*Achnatherum* sp.	3		H	*Mentzelia* sp.	<1
H	*Bromus madritensis* ssp. *rubens*	35				
H	*Erodium cicutarium*	25				
H	*Amsinckia tessellata*	3				
H	*Phacelia* sp.	1				
H	*Tropidocarpum gracile*	2				

Unusual species: _____

III. INTERPRETATION OF STAND

Field-assessed vegetation alliance name: *Encelia actoni* Shrubland

Field-assessed association name (optional): _____

Adjacent alliances: _____ / _____

Confidence in alliance identification: L (M) H Explain: *Encelia actoni* more common in many areas outside of plot.

Other identification problems: _____

Has the vegetation changed since air photo taken? Yes / No If Yes, What has changed?

Polygon is more than one type: (Yes, No) _____ (Note: type with greatest coverage in polygon should be entered in above section)

Other types: _____

CALIFORNIA NATIVE PLANT SOCIETY - VEGETATION RAPID ASSESSMENT FIELD FORM

(Desert Version Revised Feb 21, 2007)

For Office Use:	Final database #:	Final vegetation type name:	Alliance Association

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #:	Air photo #:	Date:	Name(s) of surveyors:
3		7 May 2010	Chuck Hughes

GPS waypoint #: _____ GPS name: _____ GPS datum: (e.g. NAD 83) WGS 84 Zone: 10S / 10T / (11S) (circle one)

UTM field reading: UTME 389990 ___ ___ ___ ___ UTMN 3885789 ___ ___ ___ ___ GPS Error: ± 0.8 ft / (m)

Is GPS within stand? (Yes) / No If No, cite from GPS point to stand, the distance _____(in meters) and bearing _____(degrees)

Elevation: 3,413 (ft) / m Photograph #'s:

Geology code: GRAN Soil Texture code: COLS | (Upland) or Wetland/Riparian (circle one)

Topography: Macro: top upper mid (lower) bottom | Micro: convex flat concave (undulating) (circle one)

% Surface cover: Lg rock: 0 (>25 cm diam) Sm rock: 1 (2mm-25 cm diam) Bare/Fine: 92 (<2 mm, Incl sand, mud) Litter: 5 BA Stems: 2 Water: 0 =sums to100%

Slope exposure, Actual °: _____ General: (NE) NW SE SW Flat Variable /All (circle one)

Slope steepness, Actual °: _____ General: 0° (1-5°) 5-25° > 25° (circle one)

Size of stand: <1 acre___ 1-5 acres___ >5 acres X Plot: (Yes) / No If yes, denote size: 100 m² / (400m²) / 1000 m² / Other

Site history, stand age, and comments: _____

Type/ Level of disturbance codes: 02 / M 05 / M ___/___ ___/___ ___/___ "Other"

II. HABITAT AND VEGETATION DESCRIPTION

Tree DBH : T1 (<1" dbh), T2 (1-6" dbh), T3 (6-11" dbh), T4 (11-24" dbh), T5 (>24" dbh), T6 (multi-layered) (circle one)

If Tree, list 1-3 dominant overstory spp.: _____

Shrub: S1 seedling (<3 yr. old), S2 young (<1% dead) (S3 mature (1-25% dead)) S4 decadent (>25% dead)

(Herbaceous: H1 (<12" plant ht.)) H2 (>12" ht.) Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), 2 (2-10ft. ht.), 3 (10-20ft. ht.), 4 (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), 2 (1.5-6" diam.) (3 (>6" diam.)) % NonVasc cover: 0 Total % Veg cover: 48

% Cover -Overstory Tree Conifer/Hardwood: ___/ 2 Understory tree-Tall shrub: 4 Shrub: 18 Herbaceous: 24

Height Class - Overstory Conifer/Hardwood: ___/ 04 Understory tree-Tall shrub: 03 Shrub: 02 Herbaceous: 01

Height classes: 01=<1/2m 02=1/2-1m 03=1-2m 04=2-5m 05=5-10m 06=10-15m 07=15-20m 08=20-35m 09=35-50m 10=>50m

Species (List up to 20 major species), Stratum, and Approximate % cover: Stratum categories: T= Overstory tree, U= Understory tree S = Shrub, H= Herb, N= Non-vascular. *% cover intervals for reference*: <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Strata	Species	% cover	Strata	Species	% cover
O	*Yucca brevifolia*	2	S	*Grayia spinosa*	<1
U	*Larrea tridentata*	4	H	*Lepidium fremontii*	<1
S	*Ambrosia dumosa*	5	H	*Bromus madritensis*	4
S	*Ericameria* sp.	5	H	*Erodium cicutarium*	8
S	*Ephedra viridis*	3	H	*Bromus tectorum*	6
S	*Eriogonum fasciculatum*	2	H	*Chaenactis* sp.	2
S	*Krascheninnikovia lanata*	1	H	*Achnatherum* sp.	2
S	*Hymenoclea salsola*	2	H	*Camissonia* sp.	2

Unusual species: _____

III. INTERPRETATION OF STAND

Field-assessed vegetation alliance name: *Yucca brevifolia* woodland

Field-assessed association name (optional): _____

Adjacent alliances: _____ / _____

Confidence in alliance identification: L (M) H Explain: _____

Other identification problems: _____

Has the vegetation changed since air photo taken? Yes / No If Yes, What has changed?

Polygon is more than one type: (Yes, No) _____ (Note: type with greatest coverage in polygon should be entered in above section)

Other types: _____

CALIFORNIA NATIVE PLANT SOCIETY - VEGETATION RAPID ASSESSMENT FIELD FORM

(Desert Version Revised Feb 21, 2007)

For Office Use:	Final database #:	Final vegetation type name:	Alliance Association

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #:	Air photo #:	Date:	Name(s) of surveyors:
4		7 May 2010	Chuck Hughes

GPS waypoint #: _____ GPS name: _____ GPS datum: (e.g. NAD 83) WGS 84 Zone: 10S / 10T / (11S) (circle one)

UTM field reading: UTME 391281 _____ UTMN 3886068 _____ GPS Error: ± 0.7 ft / (m)

Is GPS within stand? (Yes) / No If No, cite from GPS point to stand, the distance _____(in meters) and bearing _____(degrees)

Elevation: 3,198 (ft) / m Photograph #'s:

Geology code: GRAN Soil Texture code: MELS | (Upland) or Wetland/Riparian (circle one)

Topography: Macro: top upper mid (lower) bottom | Micro: convex (flat) concave undulating (circle one)

% Surface cover: Lg rock: 0 (>25 cm diam) Sm rock: 2 (2mm-25 cm diam) Bare/Fine: 93 (<2 mm, Incl sand, mud) Litter: 3 BA Stems: 2 Water: 0 =sums to100%

Slope exposure, Actual °: _____ General: NE NW (SE) SW Flat Variable /All (circle one)

Slope steepness, Actual °: _____ General: 0° (1-5°) 5-25° > 25° (circle one)

Size of stand: <1 acre___ 1-5 acres___ >5 acres X Plot: (Yes) / No If yes, denote size: 100 m² / (400m²) / 1000 m² / Other

Site history, stand age, and comments: _____

Type/ Level of disturbance codes: 02 / M 05 / M ___/___ ___/___ ___/___ "Other"

II. HABITAT AND VEGETATION DESCRIPTION

Tree DBH : T1 (<1" dbh), T2 (1-6" dbh), T3 (6-11" dbh), T4 (11-24" dbh), T5 (>24" dbh), T6 (multi-layered) (circle one)

If Tree, list 1-3 dominant overstory spp.: _____

Shrub: S1 seedling (<3 yr. old), S2 young (<1% dead) (S3 mature (1-25% dead)) S4 decadent (>25% dead)

(Herbaceous: H1 (<12" plant ht.)) H2 (>12" ht.) Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), 2 (2-10ft. ht.), 3 (10-20ft. ht.), 4 (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), 2 (1.5-6" diam.), 3 (>6" diam.) % NonVasc cover: 0 Total % Veg cover: 37

% Cover -Overstory Tree Conifer/Hardwood: ___/___ Understory tree-Tall shrub: 8 Shrub: 3 Herbaceous: 26

Height Class - Overstory Conifer/Hardwood: ___/___ Understory tree-Tall shrub: 03 Shrub: 02 Herbaceous: 01

Height classes: 01=<1/2m 02=1/2-1m 03=1-2m 04=2-5m 05=5-10m 06=10-15m 07=15-20m 08=20-35m 09=35-50m 10=>50m

Species (List up to 20 major species), Stratum, and Approximate % cover: Stratum categories: T= Overstory tree, U= Understory tree S = Shrub, H= Herb, N= Non-vascular. *% cover intervals for reference*: <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Strata	Species	% cover		Strata	Species	% cover
U	*Larrea tridentata*	8		H	*Tropidocarpum gracile*	2
S	*Ericameria* sp.	2		H	*Amsinckia tessellata*	<1
S	*Eriogonum fasciculatum*	1		H	*Calochortus kennedyi*	<1
S	*Ambrosia dumosa*	<1				
H	*Lasthenia californica*	10				
H	*Lotus humistratus*	4				
H	*Erodium cicutarium*	8				
H	*Bromus madritensis*	1				

Unusual species: _____

III. INTERPRETATION OF STAND

Field-assessed vegetation alliance name: *Larrea tridentata* shrubland

Field-assessed association name (optional): _____

Adjacent alliances: _____ _____ / _____ _____

Confidence in alliance identification: L M (H) Explain: _____

Other identification problems: _____

Has the vegetation changed since air photo taken? Yes / (No) If Yes, What has changed?

Polygon is more than one type: (Yes, No) _____ (Note: type with greatest coverage in polygon should be entered in above section)

Other types: _____

APPENDIX C.

Photographs

Sun Creek Wind Project
Kern County, CA

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APPENDIX C.

Photographs
TGP Alta Wind Center Project - Sun Creek Wind Project

Kern County, CA



Photo 1. View west from near the southeastern corner of the BSA. The area is creosote bush scrub with ORV roads and trails, representative of much of the creosote bush scrub in the BSA (3 May 2010).



Photo 2. Representative Joshua tree woodland in the northeastern area of the BSA. The shrub layer is similar to creosote bush scrub (3 May 2010).

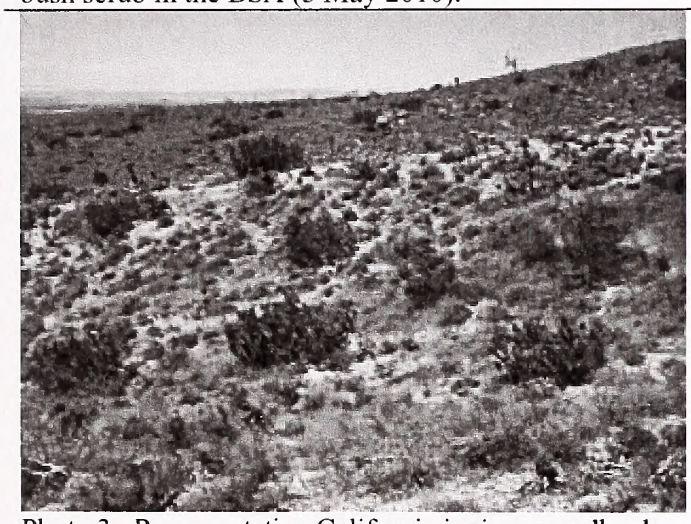


Photo 3. Representative California juniper woodland on the western side of the BSA. The shrub layer is similar to Mormon tea scrub (5 May 2010).

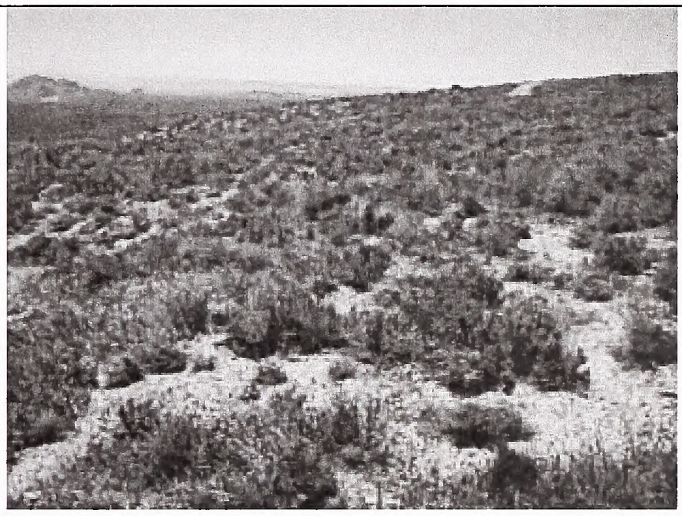


Photo 4. Representative Mormon tea scrub near the highest plateau in the BSA (7 May 2010).

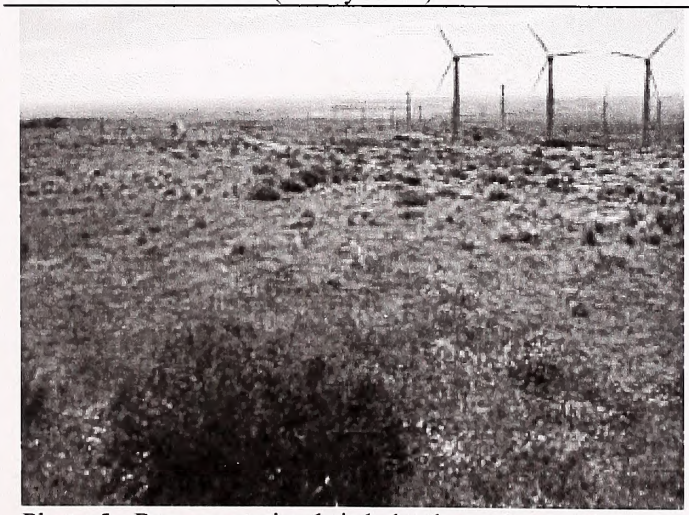


Photo 5. Representative brittle bush scrub near the southwestern corner of the BSA (5 May 2010).

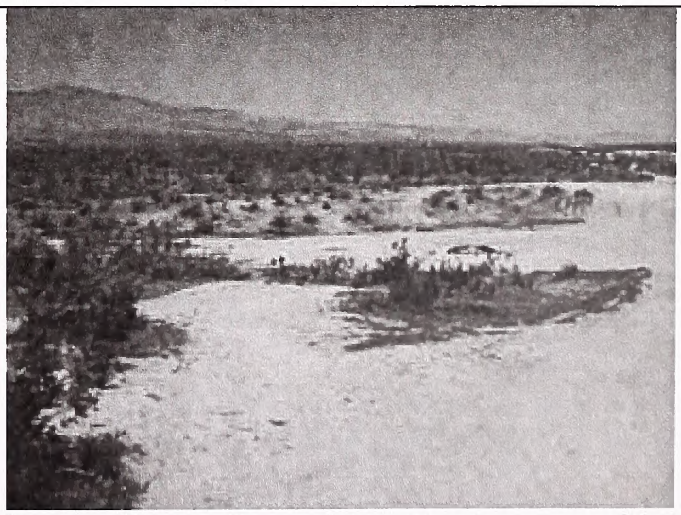


Photo 6. View north near the southeastern corner of the BSA. The acreage of disturbed, sandy, unvegetated areas was included with disturbed land (3 May 2010).

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APPENDIX D.

CNDDB Summary Report

Sun Creek Wind Project
Kern County, CA

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	Scientific Name	Common Name	Element Code	Federal Status	State Status	Global Rank	State Rank	CNPS	CDFG
1	***Agelaius tricolor***	tricolored blackbird	ABPBXB0020			G2G3	S2		SC
2	***Allium shevockii***	Spanish Needle onion	PMLIL022M0			G1	S1.3	1B.3	
3	***Aquila chrysaetos***	golden eagle	ABNKC22010			G5	S3		
4	***Astragalus hornii var. hornii***	Horn's milk-vetch	PDFAB0F421			G4G5T2T3	S2S3.1	1B.1	
5	***Astragalus leucolobus***	Big Bear Valley woollypod	PDFAB0F4T0			G2	S2.2	1B.2	
6	***Athene cunicularia***	burrowing owl	ABNSB10010			G4	S2		SC
7	***Batrachoseps stebbinsi***	Tehachapi slender salamander	AAAAD02090		Threatened	G2	S2		
8	***California macrophylla***	round-leaved filaree	PDGER01070			G3	S3.1	1B.1	
9	***Calochortus palmeri var. palmeri***	Palmer's mariposa-lily	PMLIL0D122			G2T2	S2.1	1B.2	
10	***Calochortus striatus***	alkali mariposa-lily	PMLIL0D190			G2	S2	1B.2	
11	***Canbya candida***	white pygmy-poppy	PDPAP05020			G3	S3.2	4.2	
12	***Corynorhinus townsendii***	Townsend's big-eared bat	AMACC08010			G4	S2S3		SC
13	***Ensatina eschscholtzii croceator***	yellow-blotched salamander	AAAAD04011			G5T2T3	S2S3		SC
14	***Eremophila alpestris actia***	California horned lark	ABPAT02011			G5T3Q	S3		
15	***Eriastrum tracyi***	Tracy's eriastrum	PDPLM030C0		Rare	G1Q	S1.1	1B.2	
16	***Eriogonum kennedyi var. pinicola***	Kern buckwheat	PDPGN083B4			G4T1	S1.1	1B.1	
17	***Eriophyllum mohavense***	Barstow woolly sunflower	PDAST3N070			G2	S2.2	1B.2	
18	***Eschscholzia minutiflora ssp. twisselmannii***	Red Rock poppy	PDPAP0A093			G5T2	S2.2	1B.2	
19	***Euphilotes battoides comstocki***	Comstock's blue butterfly	IILEPG201A			G5T1T3	S1S3		
20	***Falco mexicanus***	prairie falcon	ABNKD06090			G5	S3		
21	***Gopherus agassizii***	desert tortoise	ARAAF01010	Threatened	Threatened	G4	S2		
22	***Helminthoglypta concolor***	whitefir shoulderband	IMGASC2540			G1G3	S1S3		
23	***Lanius ludovicianus***	loggerhead shrike	ABPBR01030			G4	S4		SC
24	***Lasthenia glabrata ssp. coulteri***	Coulter's goldfields	PDAST5L0A1			G4T3	S2.1	1B.1	
25	***Layia heterotricha***	pale-yellow layia	PDAST5N070			G2G3	S2S3.1	1B.1	
26	***Loeflingia squarrosa var. artemisiarum***	sagebrush loeflingia	PDCAR0E011			G5T2T3	S2.2	2.2	
27	***Mimulus pictus***	calico monkeyflower	PDSCR1B240			G2	S2.2	1B.2	
28	***Monardella linoides ssp. oblonga***	Tehachapi monardella	PDLAM180D2			G5T2	S2.2	1B.3	
29	***Navarretia peninsularis***	Baja navarretia	PDPLM0C0L0			G3?	S2.2	1B.2	
30	***Onychomys torridus tularensis***	Tulare grasshopper mouse	AMAFF06021			G5T1T2	S1S2		SC
31	***Orthotrichum spjutii***	Spjut's bristle moss	NBMUS56160			G1	S1	1B.3	
32	***Perognathus alticolus inexpectatus***	Tehachapi pocket mouse	AMAFD01082			G1G2T1T2	S1S2		SC
33	***Perognathus inornatus inornatus***	San Joaquin pocket mouse	AMAFD01061			G4T2T3	S2S3		
34	***Phacelia nashiana***	Charlotte's phacelia	PDHYD0C350			G3	S3.2	1B.2	

	Scientific Name	Common Name	Element Code	Federal Status	State Status	Global Rank	State Rank	CNPS	CDFG
35	***Phrynosoma blainvillii***	coast horned lizard	ARACF12100			G4G5	S3S4		SC
36	***Streptanthus cordatus var. piutensis***	Piute Mountains jewel-flower	PDBRA2G0D2			G5T1	S1.2	1B.2	
37	***Taxidea taxus***	American badger	AMAJF04010			G5	S4		SC
38	***Toxostoma lecontei***	Le Conte's thrasher	ABPBK06100			G3	S3		SC
39	***Viola aurea***	golden violet	PDVIO04420			G3G4	S2S3	2.2	
40	***Xerospermophilus mohavensis***	Mohave ground squirrel	AMAFB05150		Threatened	G2G3	S2S3		

APPENDIX E.

USFWS Species Lists

Sun Creek Wind Project
Kern County, CA

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Ventura Fish and Wildlife Office

Pacific Southwest Region

- Ventura Homepage
- About This Office
- People and Nature
- Partnerships
- Endangered Species
- News and Publications
- Species Information
- Tools for Kids and Teachers
- Tools for Landowners

Federally Listed Threatened & Endangered Species Which May Occur In Kern County, CA

Bird		
California Condor	Gymnogyps californianus	E
Least Bell's Vireo	Vireo bellii pusillus	E
Southwestern Willow Flycatcher	Empidonax trallii extimus	E
Yellow-Billed Cuckoo	Coccyzus americanus	C
Reptile		
Desert Tortoise	Gopherus agassizzii	T

E - Endangered	T - Threatened	CH - Critical habitat
PE - Taxa proposed for listing as endangered	PT - Taxa proposed for listing as threatened	PCH - Critical habitat which has been proposed

DISCLAIMER NOTICE - The information provided on this page should not be considered an OFFICIAL species list. If you have a proposed project and are in need of an official species list, please mail a detailed request to:

Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, CA, 93003.

Last updated: May 6, 2010

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- Tools for Landowners

Federally Listed Threatened & Endangered Species Which May Occur In Los Angeles County, CA

Amphibian		
Arroyo Toad	Bufo californicus	E
California Red-Legged Frog	Rana aurora draytonii	T
Bird		
Brown Pelican	Pelicanus occidentalis	E
California Condor	Gymnogyps californianus	E
California Gnatcatcher	Polioptila californica	T
California Least Tern	Sterna antillarum browni	E
Least Bell's Vireo	Vireo bellii pusillus	E
Southwestern Willow Flycatcher	Empidonax trallii extimus	E
Western Snowy Plover	Charadrius alexandrinus nivosus	T
Yellow-Billed Cuckoo	Coccyzus americanus	C
Fish		
Southern California Steelhead	Oncorhynchus mykiss	E
Tidewater Goby	Eucyclogobius newberryi	E
Unarmored Threespine Stickleback	Gasterosteus aculeatus williamsoni	E
Invertebrate		
Riverside Fairy Shrimp	Streptocephalus woottoni	E
Plant		
Braunton's Milk-Vetch	Astragalus brauntonii	E
California Orcutt Grass	Orcuttia californica	E
Conejo Dudleya	Dudleya abramsii ssp. parva	T
Lyon's Pentachaeta	Pentachaeta lyonii	E
Marcescent Dudleya	Dudleya cymosa ssp. marcescens	T
Nevin's Barberry	Berberis nevinii	E
Santa Monica Mountains live-forever	Dudleya cymosa ssp. ovatifolia	T
Slender-Horned Spineflower	Dodecahema (=Centrostegia) leptoceras	E
Spreading Navarretia	Navarretia fossalis	T
Verity's Dudleya	Dudleya verityi	T

E - Endangered T - Threatened CH - Critical habitat

PE - Taxa proposed for PT - Taxa proposed for PCH - Critical habitat

listing as endangered	listing as threatened	which has been proposed

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Federally Listed Threatened & Endangered Species Which May Occur In San Bernardino County, CA

Amphibian		
Arroyo Toad	Bufo californicus	E
Bird		
Least Bell's Vireo	Vireo bellii pusillus	E
Southwestern Willow Flycatcher	Empidonax trallii extimus	E
Yellow-Billed Cuckoo	Coccyzus americanus	C
Yuma Clapper Rail	Rallus longirostris yumanensis	E
Fish		
Bonytail Chub	Gila elegans	E
Mohave Tui Chub	Gila bicolor mohavensis	E
Razorback Sucker	Xyrauchen texanus	E
Plant		
Cushenbury Buckwheat	Eriogonum ovalifolium var. vineum	E
Cushenberry Milk-vetch	Astragalus albens	E
Cushenbury Oxytheca	Oxytheca parishii var. goodmaniana	E
Lane Mountain Milk-Vetch	Astragalus jaegerianus	E
Parish's Daisy	Erigeron parishii	T
Reptile		
Desert Tortoise	Gopherus agassizzii	T

E - Endangered	T - Threatened	CH - Critical habitat
PE - Taxa proposed for listing as endangered	PT - Taxa proposed for listing as threatened	PCH - Critical habitat which has been proposed

DISCLAIMER NOTICE - The information provided on this page should not be considered an OFFICIAL species list. If you have a proposed project and are in need of an official species list, please mail a detailed request to:

Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
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APPENDIX F.

BLM Species List

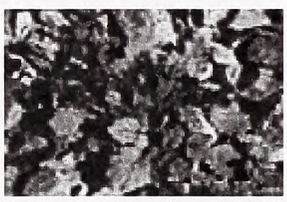
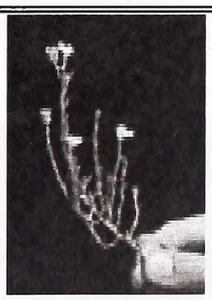
Sun Creek Wind Project
Kern County, CA

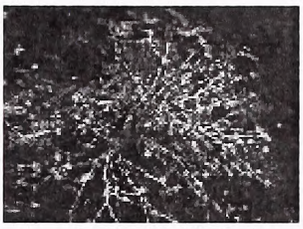
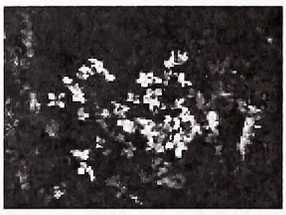
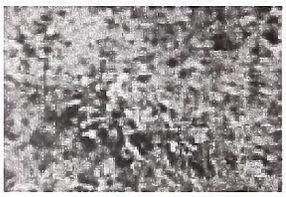
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U.S. DEPARTMENT OF THE INTERIOR **BUREAU OF LAND MANAGEMENT**
California

Special Status Plants of the Ridgecrest Field Office

This plant guide identifies the special status plants that are known to occur on public lands administered by the Bureau of Land Management, but they may only be suspected on land administered by the Alturas Field Office. To view a photograph and more information on an individual plant, click on the plant's common name below. To see a complete list of all plants, regardless of if it is known or suspected, click here.

No Image Available **Barstow Woolly-Sunflower** *Eriophyllum mohavense*	 **Bristlecone Cryptantha** *Cryptantha roosiorum*	No Image Available **Kern Buckwheat** *Eriogonum kennedyi* var. *pinicola*
 **Charlotte's Phacelia** *Phacelia nashiana*	No Image Available **Darwin Mesa Milk-Vetch** *Astragalus atratus* var. *mensanus*	No Image Available **Death Valley Sandpaper Plant** *Petalonyx thurberi* ssp. *gilmanii*
 **Desert Cymopterus** *Cymopterus deserticola*	Geyer's Milk-Vetch **Geyer's Milk-Vetch** *Astragalus geyeri* var. *geyeri*	 **Hall's Daisy** *Erigeron aequifolius*

 **Hanaupah Laphamia** *Perityle villosa*	 **Inyo Laphamia** *Perityle inyoensis*	 **Jaeger's Caulostramina** *Caulostramina jaegeri*
 **July Gold** *Dedeckera eurekensis*	 **Kelso Creek Monkeyflower** *Mimulus shevockii*	 **Mojave Tarplant** *Deinandra mohavensis*
 **Muir's Raillardella** *Carlquistia muirii*	 **Nine Mile Canyon Phacelia** *Phacelia novenmillensis*	 **Owens Peak Lomatium** *Lomatium shevockii*
 **Panamint Daisy** *Enceliopsis covillei*	 **Panamint Mountains Lupine** *Lupinus magnificus* ssp. *magnificus*	 **Panamint Mountains Buckwheat** *Eriogonum microthecum* var. *panamintense*



Red Rock Poppy

Eschscholzia minutiflora ssp. *twisselmannii*



Ripley's Cymopterus

Cymopterus ripleyi var. *saniculoides*



Spanish Needle Onion

Allium shevockii



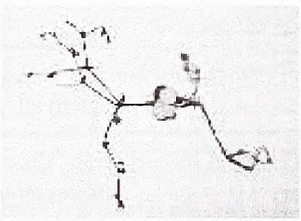
Sweet-Smelling Monardella

Monardella beneolens



Walker Pass Milk-Vetch

Astragalus ertterae



Wildrose Canyon Buckwheat

Eriogonum eremicola

Special status plants are those plants whose survival is of concern due to 1) their limited distribution, 2) low number of individuals and/or populations, and 3) potential threats to habitat. The Bureau of Land Management (BLM) uses the term "special status plants" to include: 1) Federal endangered, threatened,proposed and candidate species; 2) California State endangered, threatened, and rare species; and 3) BLM Sensitive plants. Sensitive plants are those species that do not occur on Federal or state lists, but which are designated by the BLM State Director for special management consideration.

It is BLM policy to manage for the conservation of special status plants and their associated habitats and to ensure that actions authorized, funded, or carried out do not contribute to the need to list any species as threatened or endangered.

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APPENDIX G.

Species List Provided by CH2M Hill

Sun Creek Wind Project
Kern County, CA

Plants			
Spanish needle onion *Allium shevockii*	BLM	--/1B	**Low.** No suitable habitat.
Darwin Mesa milk-vetch *Astragalus atratus*	BLM	--/1B	**Low.** Outside of species' documented range. Potentially suitable habitat may be present.
Geyer's milk-vetch *Astragalus geyeri*	BLM	--/1B	**Low.** Outside of species' documented range. Potentially suitable habitat may be present.
Curved-pod milk-vetch *Astragalus mohavensis* var. *hemigyrus*	BLM-	--/1A	**Low.** Outside of species' documented range. Potentially suitable habitat may be present.
Alkali mariposa lily *Calochortus striatus*	BLM	--/1B.2	**Moderate.** Potentially suitably habitat may be present.
White pygmy-poppy *Canbya candida*	--	--/4.2	**Moderate.** Nearest documented occurrence (1935 record) overlaps southeast portion of subarea. Potentially suitable habitat present.
Muir's raillardella [=tarplant] *Carlquistia muirii*	BLM	--/1B.3	**Low.** No suitable habitat.
Desert cymopterus *Cymopterus deserticola*	BLM	--/1B.2	**Moderate.** Potentially suitable habitat may be present.
Ripley's cymopterus *Cymopterus ripleyei* var. *saniculoides*	BLM	--/1B.2	**Low.** Outside of species' documented range. Potentially suitable habitat present.
July gold *Dedeckera eurekensis*	BLM	R/1B.3	**Low.** Outside of species' documented range. Potentially suitable habitat may be present.
Mojave tarplant *Deinandra mohavensis*	BLM	E/1B.3	**Moderate.** Potentially suitable habitat may be present.
Panamint daisy *Enciliopsis covellei*	BLM	--/1B.2	**Low.** Outside of species' documented range. Potentially suitable habitat present.
Hall's daisy *Erigeron aequifolius*	BLM	--/1B.3	**Low.** No suitable habitat. Within proximity of species' documented range.
Kern buckwheat *Eriogonum kennedyi* var. *pinicola*	BLM	--/1B.1	**Low.** No suitable habitat.
Reveal's buckwheat *Eriogonum contiguum*	BLM	--/2.3	**Low.** Outside of species' documented range. Potentially suitable habitat present.
Barstow woolly sunflower *Eriophyllum mohavense*	BLM	--/1B.2	**Moderate.** Outside of species' documented range. Potentially suitable habitat present.

Red Rock poppy *Eschscholzia minutiflora* ssp. *twisselmannii*	BLM	--/1B.2	**Low.** Potentially suitable habitat may be present, but nearest known locations are from Red Rock Canyon SP and Edwards EFB.
Red Rock tarplant *Hemizonia arida*	BLM	R / 1B2	**Low**. Potentially suitable habitat may be present, but nearest known location is from Red Rock Canyon SP.
Owens Peak lomatium *Lomatium shevockii*	BLM	--/1B.3	**Low.** No suitable habitat.
Panamint Mountains lupine *Lupinus magnificus* ssp. *magnificus*	BLM	--/1B.2	**Low.** Outside of species' documented range. Potentially suitable habitat present.
Kelso Creek monkeyflower *Mimulus shevockii*	BLM	--/1B.2	**Moderate.** Potentially suitable habitat may be present.
Sweet-smelling monardella *Monardella beneolens*	BLM	--/1B.3	**Low.** No suitable habitat.
Flax-like (=Tehachapi) monardella *Monardella linoides* ssp. *oblonga*	BLM	--/1B.3	**Low.** No suitable habitat.
Death Valley sandpaper plant *Petalonyx thurberi* ssp. *gilmanii*	BLM	--/1B.3	**Low.** Outside of species' documented range.
Round-leaved phacelia *Phacelia mustelina*	BLM	--/1B.3	**Low.** Outside of species' documented range.
Charlotte's phacelia *Phacelia nashiana*	BLM	--/1B.2	**Moderate.** Potentially suitable habitat present.
Nine Mile Canyon phacelia *Phacelia novemillensis*	BLM	--/1B.2	**Low.** No suitable habitat.
Piute Mountains jewel-flower *Streptanthus cordatus* ssp. *piutensis*	BLM	--/1B.2	**Low.** No suitable habitat.
Golden violet *Viola aurea*	--	--/2.2	**Present.** Nearest documented occurrence (historical record – date unknown) 0.94 mile southeast of Subarea.

-- = No status

Regulatory Status

[1] Federal Status:

T	Listed as Threatened by the USFWS
E	Listed as Endangered by the USFWS
C	Listed as being a Candidate Species by the USFWS
CH	Critical Habitat has been designated
BLM	Designated as BLM Sensitive

[2] State Status:

E	Listed as Endangered by the CDFG
T	Listed as Threatened by the CDFG
SC	CDFG Species of Special Concern
SR	CDFG Rare
FP	CDFG Fully Protected Species
WL	CDFG Watch List Species

[3] California Native Plant Society (CNPS) List:

1A	Plants presumed extinct in California
1B	Plants rare, threatened, or endangered in California and elsewhere
2	Plants rare, threatened, or endangered in California, but more common elsewhere
3	Plants about which we need more information - a review list
4	Plants of limited distribution - a watch list

[4] Potential to Occur within Site Boundary

Low – Either outside of species' documented ranged OR no suitable habitat present AND no recent (1950 or later) record of species w/in 10 miles of site boundary.

Moderate – Within species' documented ranged AND suitable habitat present AND no recent (1950 or later) record of species w/in 10 miles of site boundary.

High – Within species' documented ranged AND suitable habitat present AND recent (1950 or later) record of species w/in 10 miles of site boundary.

Present - Species or sign (e.g., scat, tracks, active burrow) observed during surveys OR recent (1950 or later) record of species within site boundary.

Sources: BLM 2001; Holland 1986; MH Wolfe 2009, 2008a, 2008b, 2007a, 2007b; Solick et al. 2009; Stewart 2005; Vanherweg 2006

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APPENDIX H.

Species Evaluated Table

Sun Creek Wind Project
Kern County, CA

Special-Status Species Common Name	Federal Status [a]		State Status [a, b]	Source [c]	Habitat Requirements	Potential to Occur in the BSA
	ESA	BLM				
Allium shevockii Spanish Needle onion	--	Sensitive	--/ 1B.3	2, 3	Bulbiferous herb found on rocky substrates in pinyon and juniper woodland and upper montane coniferous forest from 2,700 to 8,300 ft. Known from fewer than 10 occurrences in Kern County. Blooms May through June (CNPS 2010).	Marginal. See text.
Astragalus albens Cushenbury milk-vetch	E	--	--/ 1B.1	1	Perennial herb found in Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodland usually on carbonate substrate (rarely granitic) from 3,600 to 6,600 ft. Known from fewer than 20 occurrences in San Bernardino County. Blooms March through June (CNPS 2010).	Yes. See text.
Astragalus atratus var. *mensanus* Darwin Mesa milk-vetch	--	Sensitive	--/ 1B.1	3	Perennial herb found in Great Basin scrub, Joshua tree woodland, and on volcanic clay and gravelly soils in pinyon and juniper woodland from 5,380 to 7,600 ft. Known from Inyo County. Blooms April through June (CNPS 2010).	Marginal. See text.
Astragalus brauntonii Braunton's milk-vetch	E, CH	--	--/ 1B.1	1	Perennial herb found on recently burned or disturbed substrates, usually sandstone with carbonate layers, in chaparral, coastal scrub, and Valley and foothill grassland from 0 to 2,100 ft. Known from Los Angeles, Orange, Riverside, and Ventura counties. Blooms January through August (CNPS 2010).	No. Suitable habitat does not occur in the BSA.
Astragalus ertterae Walker Pass milk-vetch	--	Sensitive	--/ 1B.3	4	Perennial herb found in pinyon and juniper woodland from 5,600 to 6,230 ft. Known in CA from only three occurrences near Walker Pass in Kern County. Blooms April through May.	No. The BSA is outside the geographic and elevation range of the species.
Astragalus geyeri var. *geyeri* Geyer's milk-vetch	--	Sensitive	--/ 2.2	3	Annual herb found in chenopod scrub and sandy Great Basin scrub from 3,800 to 6,500 ft. Known from Inyo, Lassen, and Mono counties. Blooms May through August (CNPS 2010).	No. Suitable habitat does not occur in the BSA.

Special-Status Species Common Name	Federal Status [a]		State Status [a, b]	Source [c]	Habitat Requirements	Potential to Occur in the BSA
	ESA	BLM				
Astragalus hornii var. *hornii* Horn's milk-vetch	--	--	--/ 1B.1	2	Annual herb found on alkaline substrates and along lake margins in meadow, seep, and playa communities from 100 to 2,800 ft. Known from Inyo and Kern counties and Nevada state. Extirpated or uncertain records exist for San Bernardino and Tulare counties. Blooms May through October (CNPS 2010).	No. Suitable habitat does not occur in the BSA.
Astragalus jaegerianus Lane Mountain milk-vetch	E	--	--/ 1B.1	1	Perennial herb found in Joshua tree woodland and Mojavean desert scrub on granitic sandy or gravelly substrate from 2,900 to 3,900 ft. Known from fewer than 10 occurrences in San Bernardino County totaling nearly 1000 individual plants in 2001. Blooms April through June (CNPS 2010).	Marginal. See text.
Astragalus leucolobus Big Bear Valley woollypod	--	--	--/ 1B.2	2	Perennial herb found in lower montane coniferous forest, pebble plain, Pinyon and juniper woodland, and upper montane coniferous forest from 5,740 to 9,500 ft. Known from Inyo, Kern, Los Angeles, Riverside, San Bernardino, San Benito, San Diego, and Ventura counties. Blooms May through July (CNPS 2010).	No. The BSA is outside the elevation range of the species.
Astragalus mohavensis var. *hemigyrus* Curved-pod milk-vetch	--	Sensitive	--/ 1A	3	Annual herb found in Joshua tree woodland and Mojavean desert scrub from 4,100 to 5,250 ft. This species is presumed extinct in California. Known from Inyo County. Known in CA from one record from Darwin Mesa in 1941; potentially re-discovered by Dana York in 2003. Blooms April through June (CNPS 2010).	No. Suitable habitat does not occur in the BSA.
Berberis nevinii Nevin's barberry	E	--	E/ 1B.1	1	Evergreen shrub found in chaparral, cismontane woodland, coastal scrub, and riparian scrub on sandy or gravelly substrate from 900 to 2,700 ft. Known from Los Angeles, Riverside, San Bernardino, and San Diego counties. Blooms March through June (CNPS 2010).	No. Suitable habitat does not occur in the BSA.
California macrophylla Round-leaved filaree	--	--	--/ 1B.1	2	Annual herb found in cismontane woodland and Valley and foothill grassland from 50 to 3,930 ft. Known from Alameda, Butte, Contra Costa, Colusa, Fresno, Glenn, Kings, Kern, Lake, Lassen, Los Angeles, Merced, Monterey, Napa, Riverside, Santa Barbara, San Benito, Santa Clara, Santa Cruz Isl., San Diego, San Joaquin, San Luis Obispo, San Mateo, Solano, Sonoma, Stanislaus, Tehama, Ventura, and Yolo counties. Blooms March through May (CNPS 2010).	No. Suitable habitat does not occur in the BSA.

Special-Status Species Common Name	Federal Status [a]		State Status [a, b]	Source [c]	Habitat Requirements	Potential to Occur in the BSA
	ESA	BLM				
Calochortus palmeri var. *palmeri* Palmer's mariposa-lily	--	--	--/ 1B.2	2	Bulbiferous herb found on mesic substrates in chaparral, lower montane conifcrous forest, and meadow and seep communities from 3,200 to 7,900 ft. Known from Kern, Los Angeles, Riverside, Santa Barbara, San Bernardino, San Luis Obispo, and Ventura counties. Blooms April through July (CNPS 2010).	No. Suitable habitat does not occur in the BSA.
Calochortus striatus Alkali mariposa-lily	--	Sensitive	--/ 1B.2	2, 3	Bulbiferous herb found on alkaline mesic substrates in chaparral, chenopod scrub, Mojavean desert scrub, and meadow and seep communities from 200 to 5,300 ft. Known from Kern, Los Angeles, San Bernardino, and Tulare counties and from Nevada state. Blooms April through June (CNPS 2010).	No. Suitable habitat does not occur in the BSA.
Canbya candida White pygmy-poppy	--	Sensitive	--/ 4.2	2, 3	Annual herb found on gravelly, sandy, and granitic substrates in Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodland from 1,900 to 4,800 ft. Known from Imperial, Inyo, Kern, Los Angeles, and San Bernardino counties. Blooms March through June (CNPS 2010).	Yes. See text.
Carlquistia muirii Muir's raillardella	--	Sensitive	--/ 1B.3	3	Annual herb found in montane chaparral, lower montane coniferous forest, and granitic upper montane coniferous forest from 3,600 to 8,200 ft. Known from Fresno, Kern, and Monterey counties. Blooms July through August (CNPS 2010).	No. Suitable habitat does not occur in the BSA.
Caulostramina jaegeri Jaeger's caulostramina	--	Sensitive	--/ 1B.3	4	Perennial herb found in Great Basin scrub, Pinyon and juniper woodland, and subalpine coniferous forest from 7,000 to 9,200 ft. Known from fewer than 10 occurrences in the Inyo Mtns. in Inyo County (CNPS 2010). Blooms May through July.	No. The BSA is outside geographic and elevation range of this species.
Cymopterus deserticola Desert cymopterus	--	Sensitive	--/ 1B.2	3	Perennial herb found on sandy substrates in Joshua tree woodland and Mojavean desert scrub from 2,000 to 5,000 ft. Known from Kern, Los Angeles, and San Bernardino counties. Blooms March through May (CNPS 2010).	Yes. See text.
Cymopterus ripleyei var. *saniculoides* Ripley's cymopterus	--	Sensitive	--/ 1B.2	3	Perennial herb found in Joshua tree woodland and Mojavean desert scrub from 3,280 to 5,250 ft. Known from Inyo County. Known in CA from fewer than 10 occurrences. Blooms April through June (CNPS 2010).	No. Suitable habitat does not occur in the BSA.

Special-Status Species Common Name	Federal Status [a]		State Status [a, b]	Source [c]	Habitat Requirements	Potential to Occur in the BSA
	ESA	BLM				
Dedeckera eurekensis July gold	--	--	R/ 1B.3	3	Deciduous shrub found on carbonate substrates in Mojavean desert scrub from 4,000 to 7,200 ft. Known from Inyo and Mono counties. Known from approximately 20 occurrences. Reproductive capabilities appear extremely limited and no juvenile plants or seedlings are currently known. Blooms May through August (CNPS 2010).	No. Suitable habitat does not occur in the BSA.
Deinandra (*Hemizonia*) *arida* Red Rock tarplant	--	--	R/ 1B.2	3	Annual herb found on clay or volcanic tuff substrates in Mojavean desert scrub from 980 to 3,115 ft. Known in Kern County from fewer than 10 occurrences near Red Rock Canyon. Blooms April through November (CNPS 2010).	No. The BSA is outside the geographic range of this species.
Deinandra mohavensis Mojave tarplant	--	Sensitive	E/ 1B.3	3	Annual herb found in chaparral, coastal scrub, and riparian scrub from 2,100 to 5,250 ft. Known from Kern, Riverside, San Bernardino, and San Diego counties. Blooms June through October (CNPS 2010).	No. Suitable habitat does not occur in the BSA.
Dodecahema leptoceras Slender-horned spineflower	E	--	E/ 1B.1	1	Annual herb found on sandy substrates in chaparral, cismontane woodland, and on alluvial fans in coastal scrub from 600 to 2,400 ft. Known from Los Angeles, Riverside, and San Bernardino counties. Blooms April through June (CNPS 2010).	No. Suitable habitat does not occur in the BSA.
Dudleya abramsii ssp. *parva* (=*D. parva*) Conejo dudleya	T	--	--/ 1B.2	1	Perennial herb found on rocky or gravelly, clay or volcanic substrates in coastal scrub and Valley and foothill grassland from 100 to 1,500 ft. Known from approximately ten occurrences from the western end of Simi Hills to Conejo Grade in Ventura County. Blooms May through June (CNPS 2010).	No. Suitable habitat does not occur in the BSA. The BSA is outside the geographic range of this species.
Dudleya cymosa ssp. *marcescens* Marcescent dudleya	T	--	R/ 1B.2	1	Perennial herb found on volcanic or rocky substrate in chaparral from 400 to 1,800 ft. Known from fewer ten occurrences in the Santa Monica Mountains. Records exist in Los Angeles and Ventura counties. Blooms April through June (CNPS 2010).	No. Suitable habitat does not occur in the BSA. The BSA is outside elevation and geographic range of this species.
Dudleya cymosa ssp. *ovatifolia* Santa Monica Mountains live-forever	T	--	--/ 1B.2	1	Perennial herb found on rocky volcanic or sedimentary substrate in chaparral and coastal scrub from 400 to 5,500 ft. Known from fewer than 10 occurrences in Los Angeles and Orange counties. Blooms March through June (CNPS 2010).	No. Suitable habitat does not occur in the BSA.

Special-Status Species Common Name	Federal Status [a]		State Status [a, b]	Source [c]	Habitat Requirements	Potential to Occur in the BSA
	ESA	BLM				
Dudleya verityi Verity's dudleya	T	--	--/ 1B.2	1	Perennial herb found on volcanic and rocky substrates in chaparral, cismontane woodland, and coastal scrub from 100 to 400 ft. Known from only three occurrences near Conejo Mountain in Ventura County. Blooms May through June (CNPS 2010).	No. Suitable habitat does not occur in the BSA. The BSA is outside the elevation range of this species.
Enceliopsis covillei Panamint daisy	--	Sensitive	--/ 1B.2	3	Perennial herb found on Mojavean desert scrub from 1,300 to 6,000 ft. Clayey or rocky sub-alkaline canyon sides and sandy washes (BLM 2010). Known from Inyo County. Blooms March through June (CNPS 2010).	Yes. See text.
Eriastrum tracyi Tracy's eriastrum	--	Sensitive	R/ 1B.2	2	Annual herb found in chaparral and cismontane woodland from 1,030 to 3,200 ft. Known from Colusa, Fresno, Glenn, Kern, Santa Clara, Stanislaus, Tehama, Trinity, and Tulare counties. Blooms June through July (CNPS 2010).	No. Suitable habitat does not occur in the BSA.
Erigeron aequifolius Hall's daisy	--	Sensitive	--/ 1B.3	3	Rhizomatous herb found in broadleaved upland forest, lower montane coniferous forest, Pinyon and juniper woodland, and upper montane coniferous forest from 4,920 to 7,870 ft. Known from Fresno, Kern, and Tulare counties. Known from fewer than 20 occurrences. Blooms July through August (CNPS 2010).	Marginal. See text.
Erigeron parishii Parish's daisy	T, CH	--	--/ 1B.1	1	Perennial herb usually found on carbonate substrate (sometimes granitic) in Mojavean desert scrub and pinyon and juniper woodland from 2,600 to 6,600 ft. Known from Riverside and San Bernardino counties. Also known to occur in upper montane coniferous forest. Occurs around the northern base of the San Bernardino Mountains near Cushenbury Canyon; in the Little San Bernardino Mountains; and in the hills around Yucca Valley (BLM 2010). Blooms May through August (CNPS 2010).	Marginal. See text.
Eriogonum contiguum Reveal's buckwheat	--	--	--/2.3	3	Annual herb found in Mojavean desert scrub from 100 to 4,350 ft. Known from Inyo and San Bernardino counties. Blooms March through May (CNPS 2010).	Yes. See text.
Eriogonum eremicola Wildrose Canyon buckwheat	--	Sensitive	--/ 1B.3	4	Annual herb found in pinyon and juniper woodland and upper montane coniferous forest from 7,200 to 10,170 ft. Known from only five occurrences in Inyo County (CNPS 2010). Blooms June through September.	No. The BSA is outside the geographic and elevation range of this species.

Special-Status Species Common Name	Federal Status [a]		State Status [a, b]	Source [c]	Habitat Requirements	Potential to Occur in the BSA
	ESA	BLM				
Eriogonum kennedyi var. *pinicola* Kern buckwheat	--	Sensitive	--/ 1B.1	2, 3	Perennial herb found on clay substrates in chaparral and pinyon and juniper woodland from 4,300 to 6,400 ft. Known from only three occurrences in the Sweet Ridge area of Kern County. Blooms May through June (CNPS 2010).	Marginal. See text.
Eriogonum microthecum var. *panamintense* Panamint Mountains buckwheat	--	Sensitive	--/ 1B.3	4	Deciduous shrub found in pinyon and juniper woodland and subalpine coniferous forest from 6,200 to 10,650 ft. Blooms June through October. Known from fewer than 10 occurrences in Inyo County (CNPS 2010).	No. The BSA is outside geographic and elevation range of this species.
Eriogonum ovalifolium var. *vineum* Cushenbury buckwheat	E, CH	--	--/ 1B.1	1	Perennial herb found on carbonate substrate in Mojavean desert scrub, Joshua tree woodland, and pinyon and juniper woodland from 4,700 to 8,000 ft. Known from San Bernardino County. Blooms May through August (CNPS 2010).	No. Suitable habitat does not occur in the BSA.
Eriophyllum mohavense Barstow woolly sunflower	--	Sensitive	--/ 1B.2	2, 3	Annual herb found in chenopod scrub, Mojavean desert scrub and playas from 1,600 to 3,200 ft. Known from Fresno, Kern, Los Angeles, and San Bernardino counties. Blooms April through May (CNPS 2010).	Yes. See text.
Eschscholzia minutiflora ssp. *twisselmannii* Red Rock poppy	--	Sensitive	--/ 1B.2	2, 3	Annual herb found on volcanic tuff substrates in Mojavean desert scrub from 2,200 to 4,100 ft. Known from the Rand and El Paso mountains in Kern and San Bernardino counties. Blooms March through May (CNPS 2010).	Marginal. See text.
Lasthenia glabrata ssp. *coulteri* Coulter's goldfields	--	Sensitive	--/ 1B.1	2	Annual herb found in marshes/ swamps, playas and vernal pools from 3 to 4,000 ft. Known from Colusa, Kern, Los Angeles, Merced, Orange, Riverside, Santa Barbara, San Bernardino, San Diego, San Luis Obispo, Tulare, and Ventura counties. Blooms February through June (CNPS 2010).	No. Suitable habitat does not occur in the BSA.
Layia heterotricha Pale-yellow layia	--	Sensitive	--/ 1B.1	2	Annual herb found on alkaline or clay substrates in cismontane woodland, coastal scrub, pinyon and juniper woodland, and Valley and foothill grassland from 900 to 5,600 ft. Known from Fresno, Los Angeles, Monterey, Santa Barbara, and Ventura counties. Extirpated or uncertain records exist from Kings, Kern, San Benito, and San Luis Obispo counties. Blooms March through June (CNPS 2010).	Marginal. See text.

Special-Status Species Common Name	Federal Status [a]		State Status [a, b]	Source [c]	Habitat Requirements	Potential to Occur in the BSA
	ESA	BLM				
Loeflingia squarrosa var. *artemisiarum* Sagebrush loeflingia	--	Sensitive	--/ 2.2	2	Annual herb found on sandy substrates in desert dunes, Great Basin scrub, and Sonoran desert scrub from 2,200 to 5,300 ft. Known from Inyo, Kern, Lassen, Los Angeles, and San Bernardino counties and from Nevada, Oregon, and Wyoming. Blooms April through May (CNPS 2010).	Yes. See text.
Lomatium shevockii Owens Peak lomatium	--	Sensitive	--/1B.3	3	Perennial herb found in lower and upper montane coniferous forest from 5,800 to 7,200 ft. Known from Kern County. Blooms April through May (CNPS 2010).	No. Suitable habitat does not occur in the BSA. The BSA is outside the elevation range of this species.
Lupinus magnificus var. *magnificus* Panamint Mountains lupine	--	Sensitive	--/1B.2	3	Perennial herb found in Great Basin scrub, Mojavean desert scrub, and upper montane coniferous forest from 3,280 to 7,500 ft. Known from about ten occurrences in Inyo County. Blooms April through June (CNPS 2010).	Marginal. See text.
Mimulus pictus Calico monkeyflower	--	Sensitive	--/ 1B.2	2	Annual herb found on disturbed or granitic substrates in broadleaved upland forest and cismontane woodland from 300 to 4,300 ft. Known from Kern and Tulare counties. Blooms March through May (CNPS 2010).	Marginal. See text.
Mimulus shevockii Kelso Creek monkeyflower	--	Sensitive	--/ 1B.2	3	Annual herb found on metamorphic, sandy, or gravelly substrates in pinyon and juniper woodland and Joshua tree woodland from 2,625 to 4,400 ft. Known from about ten occurrences in Kern County. Blooms March through May (CNPS 2010).	Yes. See text.
Monardella beneolens Sweet-smelling monardella	--	Sensitive	--/ 1B.3	3	Rhizomatous herb found in alpine boulder and rock fields, subalpine coniferous forest, and upper montane coniferous forest from 8,200 to 11,500 ft. Known from fewer than 10 occurrences on the eastern Sierran crest in Inyo, Kern, and Tulare counties. Known from about ten occurrences in Kern County. Blooms July through September (CNPS 2010).	No. Suitable habitat does not occur in the BSA. The BSA is outside the elevation range of this species.
Monardella linoides ssp. *oblonga* Flax-like (=Tehachapi) monardella	--	Sensitive	--/ 1B.3	2, 3	Rhizomatous herb found in upper and lower montane coniferous forest and pinyon and juniper woodland from 2,950 to 8,100 ft. Known from Kern, Tulare, and Ventura counties. Known from about ten occurrences in Kern County. Blooms June through August (CNPS 2010).	Yes. See text.
Navarretia fossalis Spreading navarretia	T	--	--/ 1B.1	1	Annual herb found in chenopod scrub, assorted shallow freshwater marshes and swamps, playas, and vernal pools from 0 to 4,300 ft. Known from Los Angeles, San Diego, and San Luis Obispo counties and from Baja California. Blooms April through June (CNPS 2010).	No. Suitable habitat does not occur in the BSA.

Special-Status Species Common Name	Federal Status [a]		State Status [a, b]	Source [c]	Habitat Requirements	Potential to Occur in the BSA
	ESA	BLM				
Navarretia peninsularis Baja navarretia	--	--	--/ 1B.2	2	Annual herb found in chaparral, lower montane coniferous forest, meadows and seeps, and mesic pinyon and juniper woodland from 4,920 to 7,550 ft. Known from Kern, Los Angeles, Santa Barbara, San Bernardino, San Diego, and Ventura counties. Blooms June through August (CNPS 2010).	No. Suitable habitat does not occur in the BSA. The BSA is outside the elevation range of this species.
Opuntia basilaris var. *treleasei* Bakersfield cactus	E	Sensitive	E/ 1B.1	3	Stem succulent found in chenopod scrub, cismontane woodland, and Valley and foothill grassland from 400 to 1,800 ft. Known from Kern County. Blooms April through May (CNPS 2010).	Yes. See text.
Orthotrichum spjutii Spjut's bristle moss	--	--	--/ 1B.3	2	Moss found in lower montane coniferous forest, upper montane coniferous forest, subalpine coniferous forest, and pinyon and juniper woodland, often in areas with granitic or rock substrate from 6,800 to 7,900 ft. Known from Kern, Mono, and Tulare counties (CNPS 2010).	No. Suitable habitat does not occur in the BSA. The BSA is outside the elevation range of this species.
Orcuttia californica California Orcutt grass	E	--	E/ 1B.1	1	Annual herb found in vernal pools from 0 to 2,200 ft. Known from fewer than 20 occurrences in Los Angeles, Riverside, San Diego, and Ventura counties, and from Baja California. Blooms April through August (CNPS 2010).	No. Suitable habitat does not occur in the BSA.
Oxytheca parishii var. *goodmaniana* Cushenbury oxytheca	E	--	--/ 1B.1	1	Annual herb found in pinyon and juniper woodland on sandy, carbonate substrate from 4,000 to 7,800 ft. Known from only 15 occurrences in San Bernardino County. Blooms May to October (CNPS 2010).	Marginal. See text.
Pentachaeta lyonii Lyon's pentachaeta	E, CH	--	E/ 1B.1	1	Annual herb found on rocky and clay substrates in chaparral, coastal scrub, and Valley and foothill grassland from 0 to 2,100 ft. Known from Los Angeles and Ventura counties and potentially from Santa Catalina Island. Blooms March through August (CNPS 2010).	No. Suitable habitat does not occur in the BSA. The BSA is outside the geographic range of this species.
Petalonyx thurberi ssp. *gilmanii* Death Valley sandpaper plant	--	Sensitive	--/ 1B.3	3	Evergreen shrub found in desert dunes and Mojavean desert scrub from 850 to 4,750 ft. Known from fewer than 20 occurrences in Inyo and San Bernardino counties. Blooms May through September (CNPS 2010).	Marginal. See text.
Perideridia pringlei Adobe yampah	--	--	--/ 4.3	5	Perennial herb found in chaparral, cismontane woodland, coastal scrub, and pinyon and juniper woodland from 985 to 5,900 ft. Known from Kern, Los Angeles, Monterey, Santa Barbara, San Luis Obispo, Tulare, and Ventura counties. Blooms April through June (CNPS 2010).	Yes. See text.
Perityle inyoensis Inyo laphamia	--	Sensitive	--/ 1B.2	4	Perennial herb found in Great Basin scrub and pinyon and juniper woodland from 5,900 to 8,900 ft. Known from fewer than 10 occurrences in the southern Inyo Mtns. in Inyo County (CNPS 2010). Blooms in June through August.	No. The BSA is outside the geographic and elevation range of this species.

Special-Status Species Common Name	Federal Status [a]		State Status [a, b]	Source [c]	Habitat Requirements	Potential to Occur in the BSA
	ESA	BLM				
Perityle villosa Hanaupah laphamia	--	Sensitive	--/ 1B.3	4	Perennial herb found in Great Basin scrub and pinyon and juniper woodland from 5,575 to 8,530 ft. Species endemic to the mountains of Death Valley National Park (CNPS 2010). Blooms in June. Known from fewer than 10 occurrences in Inyo County.	No. The BSA is outside the geographic and elevation range of this species.
Phacelia mustelina Round-leaved phacelia	--	Sensitive	--/ 1B.3	3	Annual herb found in Mojavean desert scrub and rocky and pinyon and juniper woodland from 2,400 to 8,600 ft. Known from fewer than 20 occurrences in Inyo and San Bernardino counties. Blooms May through July (CNPS 2010).	Marginal. See text.
Phacelia nashiana Charlotte's phacelia	--	Sensitive	--/ 1B.2	2, 3	Annual herb found on typically granitic or sandy substrates in Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodland from 1,900 to 7,300 ft. Known from Inyo, Kern, and Tulare counties. Blooms March through June (CNPS 2010).	Yes. See text.
Phacelia novenmillensis Nine Mile Canyon phacelia	--	Sensitive	--/ 1B.2	3	Annual herb found in broadleaved upland forest, cismontane woodland, pinyon and juniper woodland, and upper montane coniferous forest from 5,400 to 8,670 ft. Known from Inyo, Kern, and Tulare counties. Blooms May through June (CNPS 2010).	No. The BSA is outside the elevation range of this species.
Streptanthus cordatus var. *piutensis* Piute Mountains jewel-flower	--	Sensitive	--/ 1B.2	2, 3	Perennial herb found on clay or metamorphic substrates in broadleaved upland forest, closed-cone coniferous forest, and pinyon and juniper woodland from 3,500 to 5,700 ft. Known from fewer than five occurrences in Kern County. Blooms May through July (CNPS 2010).	Yes. See text.
Viola aurea Golden violet	--	--	--/ 2.2	2, 3	Perennial herb found on sandy substrates in Great Basin scrub and pinyon and juniper woodland from 3,200 to 6,700 ft. Known from Kern, Lassen, Los Angeles, Mono, San Bernardino, San Diego, and Sierra counties and from Nevada state. Blooms April through June (CNPS 2010).	Yes. See text.

[a] **Listing Status** Federal status determined from USFWS letter (USFWS 2010). State status determined from DFG (2010a, b, and c). BLM status determined from BLM website (BLM 2010). Codes include:

E = Endangered; **T** = Threatened; **P** = Proposed; **C** = Candidate; **R** = California Rare; **CH** = Critical Habitat; * = Possibly extinct; Sensitive = BLM Sensitive.

[b] **Other Codes** CNPS (2010). Codes used in table are as follows:

CNPS List (plants only): **1A** = Presumed Extinct in CA; **1B** = Rare or Endangered (R/E) in CA and elsewhere; **2** = R/E in CA and more common elsewhere; **3** = Need more information; **4** = Plants of limited distribution.

CNPS List Decimal Extensions: .1 = Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat); **.2** = Fairly endangered in CA (20-80% of occurrences threatened); **.3** = Not very endangered in CA (< 20% of occurrences threatened or no current threats known).

[c] **Sources** **1** = From USFWS letters (USFWS 2010); **2** = From CNDDB (DFG 2010); **3** = From list provided by CH2M Hill (pers. comm., B. Canty; see Appendix G); **4** = From BLM website (BLM 2010)

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APPENDIX I.

CNDDB Field Form

for *Perideridia pringlei*

Sun Creek Wind Project
Kern County, CA

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Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 05/05/2010

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: Perideridia pringlei

Common Name: Adobe yampah

Species Found? ☒ Yes ☐ No _____ If not, why?

Total No. Individuals 30-40 Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☒ no ☐ unk.

Collection? If yes: Bower 100, Hughes 174 UC Davis
Number Museum / Herbarium

Reporter: Chuck Hughes, Mike Bower
Address: 6355 Riverside Blvd., Suite C
Sacramento, CA 95831
E-mail Address: chuck.hughes@sycamoreenv.com
Phone: 916-427-0703

Plant Information

Phenology: 100 % vegetative 0 % flowering 0 % fruiting

Animal Information

_____ # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Kern Landowner / Mgr.: BLM

Quad Name: Monolith Elevation: 3,890

T____ R____ Sec ____, ____ ¼ of _____ ¼, Meridian: H☐ M☐ S☐

T____ R____ Sec ____, ____ ¼ of _____ ¼, Meridian: H☐ M☐ S☐

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☒

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ *OR* Geographic (Latitude & Longitude) ☐

Coordinates: 3,882,969 N , 385,490 E

Source of Coordinates (GPS, topo. map & type): _____

GPS Make & Model Trimble Pro XRS

Horizontal Accuracy _____ meters/feet

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*

Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☒ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Wind farms in area.

Visible disturbances:

Threats: Wind development

Comments:

Determination: *(check one or more, and fill in blanks)*

☒ Keyed (cite reference): Hickman, ed. (1993)
☒ Compared with specimen housed at: UC Davis
☐ Compared with photo / drawing in: _____
☒ By another person (name): R. John Little, Ph.D.; Mike Bower; Onkar Singh
☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

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Appendix D-25

Botanical Survey Report Late Blooming Species 2010

Appendix D-12

Botanical Survey Report (2012)
Blooming Species 2012

Sun Creek Wind Project
Botanical Survey Report:

Late-Blooming Species
and
Bakersfield Cactus

Prepared for:
CH2M Hill, Inc.
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Prepared by:
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August 2010

GANDA

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1.0 Executive Summary

Late-season botanical surveys of the approximately 1,424-acre Sun Creek Wind Project were conducted from June 29–July 2 and from July 20–23 and July 27, 2010. These surveys supplemented the spring 2010 surveys of the Project area conducted by Sycamore Environmental Consultants. Together, the two rounds of surveys fulfill the requirements for protocol-level botanical surveys according to the guidelines of the California Department of Fish and Game (CDFG 2009), the U.S. Fish and Wildlife Service (USFWS 1996a), and the California Native Plant Society (CNPS 2001).

Pre-field research was conducted to select special-status plant species with potential to be found within the Project site. The list of potentially occurring late season special-status plants was derived from several sources including U.S. Geological Survey 7.5' quadrangle-based searches of the California Natural Diversity Database (CNDDB), the CNPS on-line Inventory, and other sources. Sixteen late season special-status plant species were determined to have potential to occur within the Project site based on habitat preferences, blooming period and known distribution.

Two special-status plant species were observed within the Project site:

- Bakersfield cactus (*Opuntia basilaris* var. *treleasei*; FE, SE, CNPS List 1.B1)
- Adobe yampah (*Perideridia pringlei;* CNPS List 4.3)

363 sites, each with a single Bakersfield cactus, were mapped within the Project area. Six sites with an estimated total of 23 individuals of adobe yampah were also mapped.

2.0 Introduction

Garcia and Associates (GANDA), as a subcontractor to CH2M Hill, Inc. (CH2M HILL), was tasked with conducting late season botanical surveys for the Sun Creek Wind Project and to utilize more recent identification criteria for Bakersfield cactus to evaluate Sycamore's conclusion that no Bakersfield cactus were present on the project site. The purpose of the surveys was to detect the presence of potentially-occurring late season special-status plant species, and to supplement the findings presented in the Botanical Inventory Report prepared by Sycamore Environmental Consultants (2010). During the surveys completed by GANDA and described in this report, all *Opuntia basilaris* individuals were mapped and identified as either the Federal and State-listed Bakersfield cactus (*O. b.* var. *treleasei*) or the common beavertail cactus (*O. b.* var. *basilaris*) according to guidance provided by the California Department of Fish and Game (CDFG; Ellen Cypher personal communication; Bowen, 1986).

2.1 Project Description

Alta Windpower Development, LLC proposes to construct the Sun Creek Wind Project (the Project) in southeastern Kern County, California (Figure 1). The proposed Project includes approximately 1,424 acres in the western Mojave Desert.

2.2 Project Area

The Project is located in the northern Antelope Valley in the western Mojave Desert and foothills of the Tehachapi Mountains in Kern County, California. The Project site is located approximately 3 miles northwest of the developed City of Mojave, 11 miles southeast of the City of Tehachapi and on both sides of Highway 58 (Figure 1). The terrain of the Project site varies between gently sloping bajadas to steep ridges and drainages in the foothills. Elevations within the Project site range from approximately 3,150 to 4,180 feet.

The Project is located on private and public lands administered by the Bureau of Land Management (BLM) within the Mojave and Monolith 7.5' U.S. Geological Survey (USGS) quadrangles. The Project is accessible by Oak Creek Road and Business Route CA-58. The Project is bordered on the eastern edge by the California Aqueduct.

Rainfall in the vicinity of the Project area preceding the 2010 botanical surveys was above average. The historic (1982 to present) average precipitation in Tehachapi for the period between October and April is 9.67 inches (CDWR 2010). From October 2009 through April 2010, the Tehachapi Airport gauge received approximately 11.7 inches of rain (CDWR 2010). The Tehachapi Airport gauge is located approximately 11 miles west of the Project area.

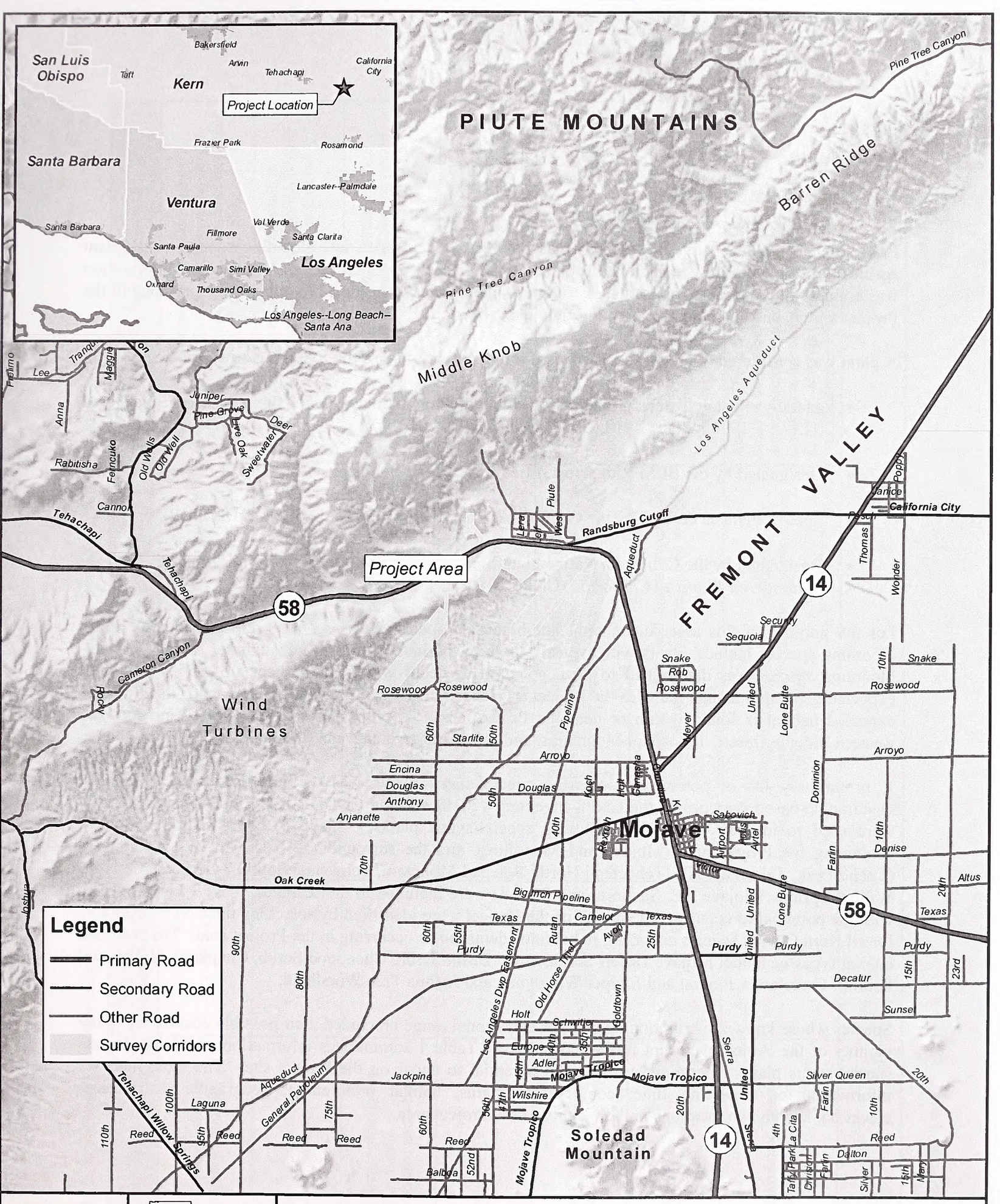


Figure 1
Project Location
Sun Creek Wind Project

Kern County, CA
August, 2010

3.0 Methods

3.1 Special-status plants

3.1.1 Pre-field research and literature review

Prior to the botanical surveys, research was conducted to identify late-blooming special-status plant species with potential to occur on the Project site. For each potentially occurring species, information was compiled on conservation status, distribution, habitat characteristics, blooming time, presence in the Project region, and characteristics used in field identification.

A plant was considered to be of special-status if it met one or more of the following criteria:

- Federally or state-listed, proposed, or candidate for listing, as rare, threatened or endangered (USFWS 1996b, 2006, 2010; CDFG 2009, CNPS 2010); or
- Designated by the BLM Ridgecrest office as a Special-Status plant, or Plant of Interest; or
- Special Plant as defined by the California Natural Diversity Database (CNDDB 2010); or
- Designated by the California Native Plant Society (CNPS) in its *Inventory of Rare and Endangered Plants of California* (CNPS 2010)

For the purpose of this assessment, only late-blooming special-status species were considered. Late-blooming species include plants with typical blooming periods in mid to late summer or fall. A late-blooming species was determined to have potential to occur within the Project area if its known or expected geographic range includes the Project area or the vicinity of the Project area, and if its known or expected habitat is found within or near the Project area. For this Project, the vicinity includes the western Mojave Desert, Tehachapi Mountains, and southern Sierra Nevada Mountains.

A preliminary list of potentially occurring special-status plants was derived from several sources. Quadrangle-based searches of the CNPS Inventory (2010) and the CNDDB RareFind3 database (2010) were used to identify potentially occurring special-status plants. The two 7.5' USGS quadrangles containing the Project area (Mojave and Monolith,), and the surrounding 10 USGS 7.5' quadrangles (Cache Peak, Tehachapi NE, Tehachapi North, Soledad Mountain, Tehachapi South, Tylerhorse Canyon, Willow Springs, Mojave NE, Sanborn, and Bissell) were included in the searches. CNPS List 4 species with the potential to occur in the vicinity of the Project were identified by searching the CNPS Inventory for all Kern County species occurring in habitats identified as occurring in the Project area. The searched habitat types included: Mojave Desert Scrub, Great Basin Scrub, Chenopod Scrub, Chaparral, Valley and Foothill Grasslands, Pinyon and Juniper Woodland, and Joshua Tree Woodland.

Species whose known distribution, habitat, or elevational range precluded their possible occurrence in the vicinity of the Project were not further considered. Table 1 summarizes information on 16 late season special-status plants determined to have the potential to occur on the Project site. The table includes information on flowering time, conservation status, habitat preferences, geographic distribution, elevation, and known locations in the vicinity of the Project area.

Table 1. Late season special-status plant species with the potential to occur on the Sun Creek Wind Project.

Taxon	Status[1] FWS / DFG / BLM / CNPS	Blooming period	Habitat and elevation	Potential for occurrence[2]
Chamaesyce vallis-mortae Death Valley sandmat	-- / -- / PI / 4.2	May-Oct	Mojavean desert scrub (sandy or gravelly). 760 to 4,800 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The species is known to occur south of Red Rock Canyon, 20 mi NE of the project area.
Chorizanthe spinosa Mojave spineflower	-- / -- / -- / 4.2	Mar-Jul	Chenopod Scrub, Joshua Tree Woodland, Mojavean Desert Scrub. 20 to 4,290 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 6 mi E of the project area.
Cordylanthus rigidus ssp. *brevibracteatus* short-bracted bird's-beak	-- / -- / -- / 4.3	Jul-Aug	Chaparral, Lower Montane Coniferous Forest, Pinyon and Juniper Woodland, Upper Montane Coniferous Forest/openings, granitic. 3,000 and 7,000 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 12 mi W of the project area.
Deinandra arida Red Rock tarplant	-- / SR / S / 1B.2	Apr-Nov	Mojavean Desert Scrub clay soil; dry to moist sites where water has collected along ephemeral streams, & along road edges. 900 to 3,160 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. Known only from the Red Rock Canyon area 20 mi N of the project area. Only a limited amount of suitable habitat is present in project area.
Deinandra mohavensis Mojave tarplant	-- / SE / S / 1B.3	Jun-Oct (Jan)	Riparian Scrub, Chaparral - low sand bars in river bed; mostly in riparian areas or in ephemeral grassy areas. 1,800 and 4,000 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 20 mi N of the project area near Jawbone Canyon.
Dudleya calcicola limestone dudleya	-- / -- / -- / 4.3	Apr-Aug	Chaparral, Pinyon and Juniper Woodland. - rocky places on limestone. 1,640 to 8,528 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. Only a limited amount of suitable habitat is present in project area.
Eriastrum brandegeeae Brandegee's Eriastrum	-- / -- / S / 1B.2	Apr-Aug	Chaparral, Cismontane Woodland. - on barren volcanic soils; often in open areas. 1,000-3,380 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period, and is restricted to northern California. Collections from the vicinity of Piute Mtn are likely *E. tracyi*, which is listed as a synonym of *E. brandegeeae* in Hickman (1993).

Taxon	Status[1] FWS / DFG / BLM / CNPS	Blooming period	Habitat and elevation	Potential for occurrence[2]
Eriastrum tracyi Tracy's eriastrum	-- / SR / S / 1B.2	Jun-Jul	Chaparral, Cismontane Woodland. - gravelly shale or clay; often in open areas. 1,040 to 3,220 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 10 miles W of the Project area.
Fritillaria pinetorum pine fritillary	-- / -- / PI / 4.3	May-Jul (Sep)	Chaparral, Lower Montane Coniferous Forest, Pinyon and Juniper Woodland, Subalpine Coniferous. Forest, Upper Montane Coniferous Forest. - granite or metamorphics. 5,906 to 10,827 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location on Tehachapi Mtn. 5 mi W of the project area.
Goodmania luteola golden goodmania	-- / -- / -- / 4.2	Apr-Aug	Meadows, Mojavean Desert Scrub, Playas, Valley and Foothill Grassland. - in the central valley from Madera County to Kern County. 65 to 7,216 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is Edwards Air Force Base 20 mi E of the project area.
Monardella linoides ssp. *oblonga* Tehachapi monardella	-- / -- / S / 1B.3	Jun-Aug	Lower Montane Coniferous Forest, Upper Montane Coniferous Forest, Pinyon and Juniper Woodland. - on dry slopes of yellow pine forest, decomposed granitic soils; also in roadside disturbed areas. 5,560 and 8,100 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. There are four recent occurrences approx. 7 mi W of the project area.
Navarretia setiloba Piute Mtns. Navarretia	-- / -- / S / 1B.1	Apr-Jul	Cismontane Woodland, Pinyon and Juniper Woodland, Valley and Foothill Grassland. - red clay soils, other clay soils, or on gravelly loam. 1,000 to 6,930 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. There are records of this species within the Monolith quad which contains the project area.
Opuntia basilaris var. *treleasei* Bakersfield cactus	FE / SE / S / 1B.1	Apr-May	Chenopod Scrub, Valley and Foothill Grassland, Cismontane Woodland. – coarse or cobbly well-drained granitic sand on bluffs. 460 to 1,800 ft.	**Present.** 363 individuals were mapped throughout the project site.
Perideridia pringlei adobe yampah	-- / -- / -- / 4.3	Apr-Jun (Jul)	Chaparral, Cismontane woodland, Coastal scrub, Pinyon and juniper woodland/serpentinite, often clay. 985 to 5,900 ft.	**Present.** Six sites with approximately 23 individuals were observed
Sclerocactus polyancistrus Mojave fish-hook cactus	-- / -- / -- / 4.2	Apr-Jul	Joshua Tree Woodland, Mojavean Desert Scrub. - well-drained soil, on rocky gravelly mesas, slopes & outcrops; sometimes on limestone. 1,800 and 7,500 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. Known from a single collection record in Kern County.

Taxon	Status[1] FWS / DFG / BLM / CNPS	Blooming period	Habitat and elevation	Potential for occurrence[2]
Streptanthus cordatus var. *piutensis* Piute Mountains jewel-flower	-- / -- / S / 1B.2	May-Jul	Broadleafed Upland Forests, Closed-Cone Coniferous Forest, Pinyon and Juniper Woodland. - along roadbanks and cliffs, metamorphic-red clay soils. 3,600 to 5,725 feet.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is near Cache Peak 10 mi N of the project area.

Sources:
California Native Plant Society. 2010; California Natural Diversity Database. 2010;Jepson Online Interchange. 2010; Consortium of California Herbaria 2010.

[1] **Conservation status abbreviations:**

U.S. Fish and Wildlife Service designations:
- FE Endangered: Any species in danger of extinction throughout all or a significant portion of its range.
- FT Threatened: Any species likely to become endangered within the foreseeable future.

California Department of Fish and Game designations:
- SE Endangered: Any species in danger of extinction throughout all or a significant portion of its range.
- ST Threatened: Any species likely to become endangered within the foreseeable future.
- SR Rare: Any species not currently threatened with extinction, but in such small numbers throughout its range that it may become endangered if its present environment worsens.

Bureau of Land Management designations:
- S Special-Status
- PI Plants of Interest

California Native Plant Society designations:
- 1B Plants rare, threatened or endangered in California and elsewhere.
- 2 Plants rare, threatened or endangered in California, but more common elsewhere.
- 3 Plants for which more information is needed – a review list.
- 4 Plants of limited distribution – a watch list.

California Native Plant Society threat categories:
- .1 Seriously endangered in California.
- .2 Fairly endangered in California.
- .3 Not very endangered in California.

[2] **Occurrence potential definitions:**

- Present: Species or sign of their presence observed on the site.
- Likely: Species or sign not observed on the site, but reasonably certain to occur on the site.
- Possible: Species or sign not observed on the site, but conditions suitable for occurrence.
- Unlikely: Species or sign not observed on the site, conditions marginal for occurrence.
- Absent: Species or sign not observed on the site during protocol-level surveys.

3.1.2 Reference Site Visits

A reference site visit was conducted for one special-status plant with potential to occur on the Project site:

Mohave tarplant (*Deinandra mohavensis*): Several hundred plants in early flowering condition (50% in flower) were observed in and adjacent to Cutterbank Spring (CNDDB occurrence number 19), south of Jawbone Canyon on June 24, 2010.

3.1.3 Late-season surveys

Transect-based botanical surveys were conducted from June 29–July 2 and from July 20–23 and July 27, 2010. Surveys were conducted by GANDA botanists Onkar Singh, Theresa Johnson, Morgan King, and Eliza Shepard. The goal of the surveys was to census, map, and record all special-status plant locations within the Project area. Surveys were floristic in scope, meaning that all plants found in identifiable condition were identified to the level necessary to determine their rarity or listing status.

Trimble GeoXH global positioning systems (GPS) with sub-meter accuracy were used to map special-status plant species and Bakersfield cactus. The GPS units were equipped with Project-specific data files and data dictionaries for navigation and data collection. The data files included parallel transect lines spaced at 50-foot intervals that covered the Project corridors, and were used to record special-status species locations and the actual or estimated number of individuals observed. Initial surveys were conducted at 50-foot intervals, but transitioned to 100-foot intervals on June 30, 2010 after it was determined that 100-foot transect spacing was suitable for detecting special-status species and cacti due to the low diversity of habitat and low density of cacti. A small area of extremely steep slopes in the northwestern portion of the Project was not surveyed due to safety concerns (Figure 1). Close-up and habitat photographs of the special-status species encountered were taken at representative localities.

The ability of surveyors to detect and identify plants rapidly and accurately in the field was enhanced by a field review of the common plant species at the Project site prior to beginning the surveys. All surveyors were provided with photo guides of targeted special-status plants and preliminary species lists compiled prior to the field surveys.

3.1.4 Bakersfield cactus mapping and identification

In surveys of separate portions of the greater Alta-Oak Creek Mojave Project (AOCM) area conducted during the early spring of 2010, GANDA botanists observed *Opuntia basilaris* individuals identifiable as beavertail cactus (*O. b.* var. *basilaris*), individuals identifiable as the Federal and State-listed Bakersfield cactus (*O. b.* var. *treleasei*), and individuals morphologically intermediate between the two varieties.

In a meeting at the AOCM site on April, 8, 2010, Dr. Ellen Cypher of the CDFG indicated that all individual cacti bearing any characteristics of Bakersfield cactus should be identified as that variety, and should receive full protection under the California Endangered Species Act. Dr. Cypher discussed the diagnostic morphological characters for the identification of Bakersfield cactus and supplied some additional literature useful for distinguishing between the varieties. Following the discussion, GANDA botanists consulted a number of published floras and other materials including the Jepson manual (Hickman 1993), A Flora of Southern California (Munz 1974), The Illustrated Flora of the Pacific States (Abrams 1960), the Flora of North America (FNA 1993), an unpublished manuscript provided by CDFG (Bowen 1986), and the original description of the variety (Coulter 1896), in order to determine the most reliable morphological characters for identifying Bakersfield cactus in the field. After experimenting with recording data for a number of morphological features, three characters were chosen as the most repeatable and reliable for the identification of Bakersfield cactus by crews in the field: the presence or

absence of spines, the depression or elevation of the areoles on the stems, and the vestiture of the stem surface. The character states indicative of each variety are presented in Table 2.

Table 2. Morphological characters used to distinguish between Bakersfield and beavertail cactus.

Variety	Spines	Areoles	Stem (pad) vestiture
Bakersfield cactus	At least one spine	Flush or raised	None
Beavertail cactus	No spines	Depressed	Minutely puberulent

During the botanical surveys, the position of every *Opuntia basilaris* plant occurring within the Project area was recorded with a Trimble GeoXH GPS unit. Data for each of the three diagnostic morphological characters were recorded for each mapped individual directly into data dictionaries on the GPS units. Following the surveys, the mapped cacti were assigned an identity based on their morphological characteristics. Cacti displaying any one, or combination, of the three diagnostic characters were considered to be Bakersfield cactus. It should be noted that the criteria used for the identification of Bakersfield cactus in this report were developed specifically to meet the requirements of CDFG, and that these criteria are conservative, meaning that they are more likely to identify a plant as Bakersfield cactus than the criteria contained in the keys and descriptions of the standard floras such as the Jepson Manual (Hickman 1993), A Flora of Southern California (Munz 1974), and the Flora of North America (FNA 1993).

3.2 California Desert Native Plants Act

Several species that occur on the Sun Creek Wind Project site are protected under the California Desert Native Plants Act (CDNPA): Joshua tree (*Yucca brevifolia*), beavertail cactus, Bakersfield cactus, and silver cholla (*Opuntia echinocarpa*). All Bakersfield and beavertail cactus were mapped with a Trimble GeoXH GPS unit, as described above. Other species covered under the CDNPA were not mapped pending finalization of the project design, as directed by CH2M Hill.

4.0 Results

4.1 Special-status plants observed on the Project site

Two special-status plant species were observed within the Project site: Bakersfield cactus and adobe yampah (*Perideridia pringlei*). A summary of each species' status, the number of sites mapped, and the number of individuals observed is presented in Table 3. Each species is discussed in detail in the sections below. A list of all late-season species observed within the Project area that were not included in Sycamore's report is presented in Appendix A.

Table 3. Special-status plants observed on the Sun Creek Wind Project site.

Species observed	Federal status	State status	CNPS status	No. Sites	No. Obs.
Opuntia basilaris var. *treleasei* Bakersfield cactus	Endangered	Endangered	1B.1	363	363
Perideridia pringlei Adobe yampah	--	--	4.3	6	23

4.1.1 *Bakersfield cactus (Opuntia basilaris var. treleasei)*

Bakersfield cactus is a perennial low-growing stem succulent in the Cactus family (Cactaceae) that typically spreads to form extensive thickets. The stems form fleshy, flattened green pads up to 18 cm long by 1 to 1.5 cm thick. The flowers are magenta and usually appear in May (ESRP 2006). Bakersfield cactus is State and Federally endangered and is included on CNPS List 1B.1.

The distribution of Bakersfield cactus has been described in a recent USFWS Recovery Plan (USFWS 1998) as restricted to a limited area of central Kern County near Bakersfield at elevations from approximately 460 to 1,800 feet. Previously, extensive colonies existed around Bakersfield, along the bluffs of the Kern River, along the Caliente Creek drainage and nearby in the foothills of the western Tehachapi Mountains, and south to the Tejon Hills. Twisselmann (1967) describes a very large population in the Sand Ridge area near Arvin that eventually was protected by The Nature Conservancy within the Sand Ridge Preserve (USFWS 1998). The current distribution of Bakersfield cactus in the Bakersfield area is fragmented and much reduced (ESRP 2006). Specimen records from the Consortium of California Herbaria (CCH 2010) include three specimens from the Mojave Desert near the town of Mojave. These specimens are from the 1930s, and the occurrences in this report and others from the greater AOCM project area represent the most recent records of Bakersfield cactus in the Mojave Desert proper. Approximately one-third of the historical occurrences of Bakersfield cactus have been extirpated and the remaining populations are highly fragmented (USFWS 1998, ESRP 2006).

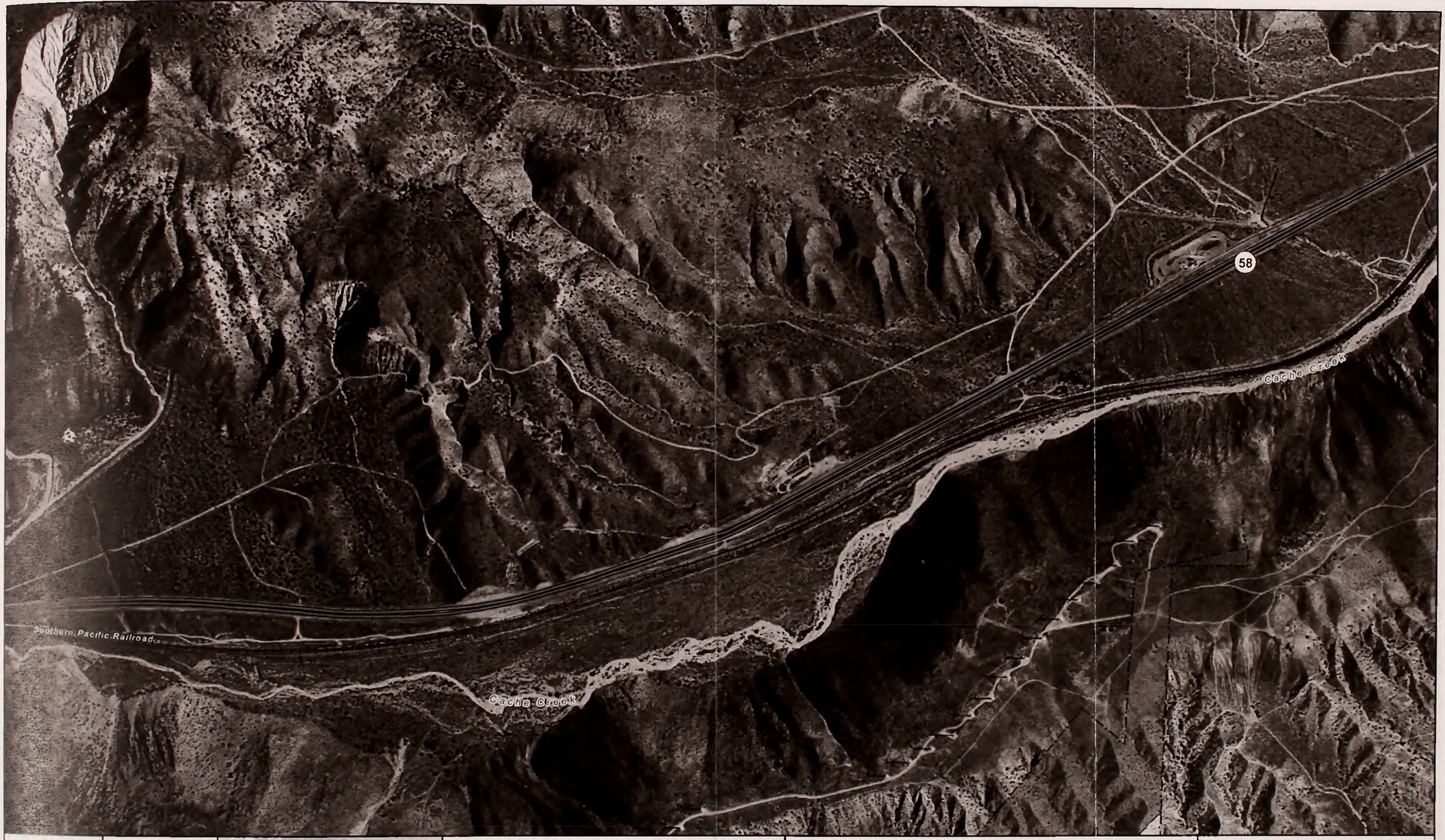
A total of 363 Bakersfield cacti were observed onsite (Figure 2). Each of these cacti meet one or more of the criteria described in the methods section of this report to distinguish common beavertail cactus from Bakersfield cactus. Appendix B presents a table with the geographic coordinates of each Bakersfield cactus mapped within the Sun Creek Wind Project area. A representative photo of the variety is included in Appendix D.

4.1.2 *Adobe yampah (Perideridia pringlei)*

Adobe yampah is a perennial herb in the Carrot family (Apiaceae) found in Chaparral, Cismontane Woodland, Coastal Scrub, and Pinyon and Juniper Woodland at elevations from 985 to 5,900 feet (CNPS 2010). It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list.

In California, adobe yampah is known from Kern, Los Angeles, Monterey, Santa Barbara, San Luis Obispo, Tulare, and Ventura counties (CNPS 2010). No CNDDB records exist for this species, but there are many collections reported for Kern County (CCH 2010). The closest record is from Tomo-Kahni (Creation Cave) State Historical Park, northeast of Monolith and Tehachapi, about seven miles north of the Project area.

Sycamore Environmental Consultants' survey of the Sun Creek Wind Project area found a population of 30-40 individuals of adobe yampah in the southwest corner of the Project area (Sycamore 2010). Additional populations of Adobe yampah were observed within the Project area during late season botanical surveys conducted by GANDA. The plants were past fruiting condition but were identifiable. A total of approximately 23 adobe yampah individuals were observed at six locations in the western portion of the Sun Creek Wind Project area (Figure 3). Appendix C presents a table with the geographic coordinates of each adobe yampah population mapped by GANDA within the Sun Creek Wind Project area. A representative photo of this species is included in Appendix D.



GANDA

Project Location

Map 1 of 4

1 2 3 4

OPBA Occurrence
Corridor Surveyed
Corridor Not Surveyed
Access Route
Primary Road
Secondary Road
Other Road
Railroad

0 500 1,000 1,500 2,000 ft
0 150 300 450 600 m

USGS 7.5' Quad: MOJAVE (1973), MONOLITH (1995)
T32S R35E Sec 32, 33

N

1:9,000
One In = 750 Ft

Figure 2
Bakersfield Cactus Occurrences
Sun Creek Wind Project

Map 1 of 4

Kern County, California
August, 2010



GANDA

Project Location

Map 2 of 4

1 2 3 4

OPBA Occurrence
Corridor Surveyed
Corridor Not Surveyed
Access Route
Primary Road
Secondary Road
Other Road
Railroad

0 500 1,000 1,500 2,000 ft
0 150 300 450 600 m

USGS 7.5' Quad: MQJAVE (1973)
T32S R35E Sec 26-28, 33-35

N

1:9,000
One In = 750 Ft

Figure 2
Bakersfield Cactus Occurrences
Sun Creek Wind Project
Map 2 of 4
Kern County, California
August, 2010



GANDA

Project Location

Map 3 of 4

1 2 3 4

OPBA Occurrence
Corridor Surveyed
Corridor Not Surveyed
Access Route
Primary Road
Secondary Road
Other Road
Railroad

0 500 1,000 1,500 2,000 ft
0 150 300 450 600 m

USGS 7.5' Quad: MOJAVE (1973), MONOLITH (1995)
T32S R35E Sec 32; T12N R13W Sec 34

N

1:9,000
One In = 750 Ft

Figure 2
Bakersfield Cactus Occurrences
Sun Creek Wind Project

Map 3 of 4

Kern County, California
August, 2010



GANDA

Project Location

Map 4 of 4

1 2 3 4

OPBA Occurrence
Corridor Surveyed
Corridor Not Surveyed
Access Route
Primary Road
Secondary Road
Other Road
Railroad

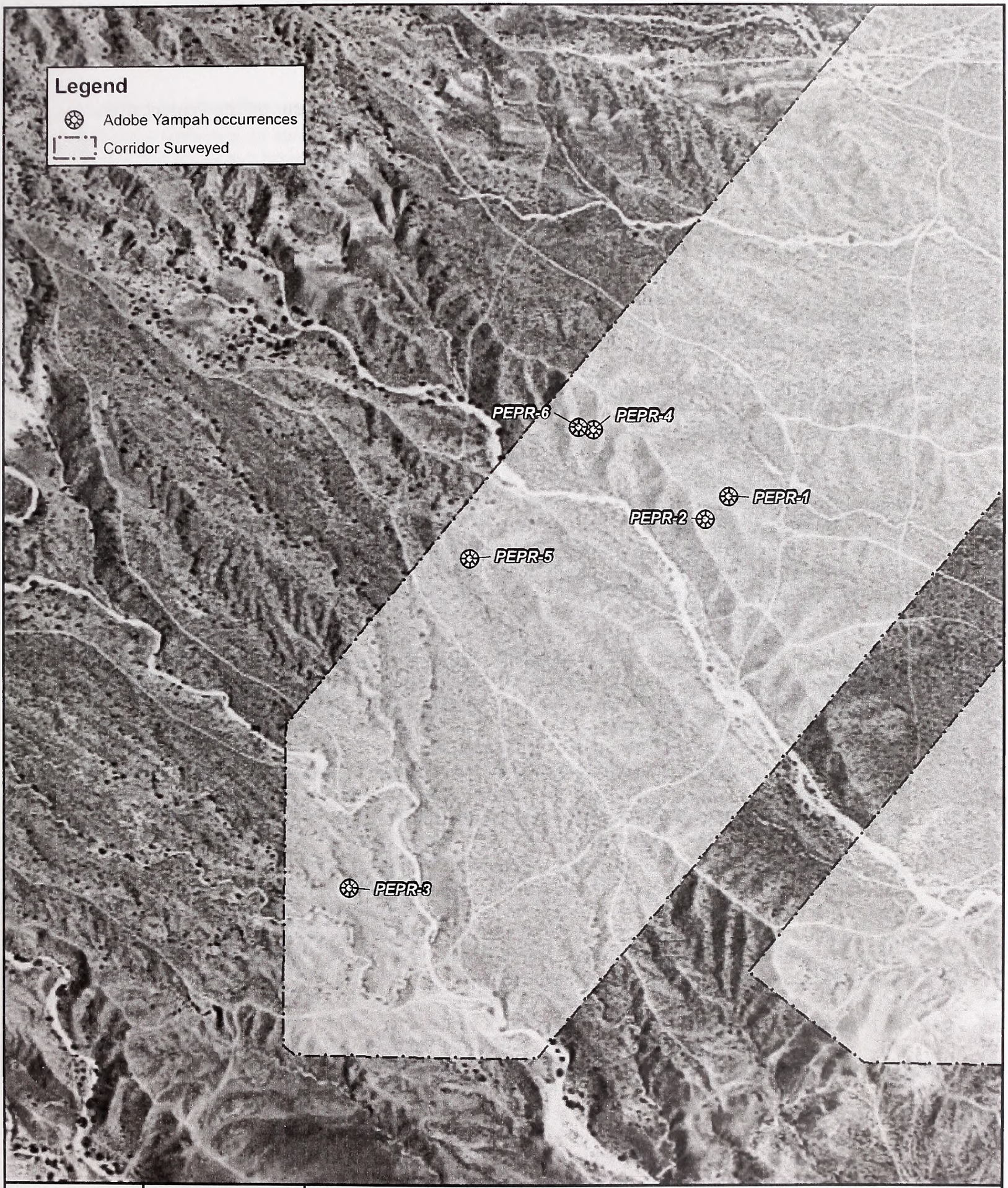
0 500 1,000 1,500 2,000 ft
0 150 300 450 600 m

USGS 7.5' Quad: MQJAVE (1973)
T32S R35E Sec 34, 35; T12N R12W Sec 31

N

1:9,000
One In = 750 Ft

Figure 2
Bakersfield Cactus Occurrences
Sun Creek Wind Project
Map 4 of 4
Kern County, California
August, 2010



GANDA

Project Location

0 250 500 750 1,000 ft

0 75 150 225 300 m

N

USGS 7.5' Quad: MOJAVE (1973)
Legal Description: T32S R35E Sec 34

1:6,000
One In = 500 Ft

Figure 3
Adobe Yampah Occurrences
Sun Creek Wind Project

Kern County, California
August, 2010

4.2 Special-status plants not observed, but with the potential to occur on the Project site

Death Valley sandmat (*Chamaesyce vallis-mortae*)

Death Valley sandmat is a perennial prostrate herb in the Spurge family (Euphorbiaceae). It is typically found in Mojavean Desert Scrub habitats on sandy or gravelly substrates (CNPS 2010). Known occurrences range in elevation from 760 to 4,800 feet. It has no State or Federal listing status, but is considered a Plant of Interest by BLM and is included on CNPS List 4.2, a watch list.

In California, Death Valley sandmat is known from Inyo, Kern, and San Bernardino counties in the Mojave Desert (CNPS 2010). The closest known location to the Project area is Red Rock Canyon 20 miles northeast of the Project area. (CCH 2010).

Although suitable habitat for Death Valley sandmat occurs in the Project area within Creosote Bush Scrub, botanical surveys conducted by GANDA during the blooming period of Death Valley sandmat (May to October), did not detect the species within the Project area. Only the common species whitemargin sandmat *(Chamaesyce albomarginata)* was observed.

Mojave spineflower (*Chorizanthe spinosa*)

Mojave spineflower is an annual herb in the Knotweed family (Polygonaceae) that has inconspicuous flowers that are only 3 mm (0.12 in) long. There are generally five bracts per flower, with one bract much longer than the others. It is typically found in Chenopod Scrub, Joshua Tree Woodland, and Mojavean Desert Scrub habitat (CNPS 2010). Known occurrences range in elevation from 20 to 4,290 feet.

In California, Mojave spineflower is endemic to the west Mojave Desert within Kern, Los Angeles, and San Bernardino counties (CNPS 2010). The closest known location to the Project area is 6 miles east in the Antelope Valley (CCH 2010). It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

Marginal habitat for Mojave spineflower occurs in the Project area within Creosote Bush Scrub and Joshua Tree Woodland. Botanical surveys conducted by GANDA during the blooming period of Mojave spineflower, March to July, did not detect the species within the Project area.

Short-bracted bird's-beak (*Cordylanthus rigidus* ssp. *brevibracteatus*)

Short-bracted bird's-beak is a many branched annual species in the Figwort family (Schropulariaceae) that is found in the southern Sierra Nevada floristic province (Hickman 1993). It occurs in the understory and in granitic openings within Chaparral, Lower and Upper Montane Coniferous Forest, and Pinyon and Juniper Woodland vegetation communities at elevations between 3,000 and 7,000 feet (CNPS 2010). It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list.

Short-bracted bird's beak is endemic to California. It has been reported to occur in Kern, Tulare, Fresno and Mariposa counties. The closest reported occurrence of short-bracted bird's beak is approximately 12 miles west from the Project area in Antelope Canyon, south of Highway 58 (CCH 2010).

Marginal habitat for short-bracted bird's beak is present in the higher elevations of the Project area. Botanical surveys conducted by GANDA during the blooming period of short-bracted bird's beak, July to August, did not detect the subspecies within the Project area. No species of this genus were observed.

Red Rock tarplant (*Deinandra arida*)

Red Rock tarplant is an annual tarplant in the Sunflower family (Asteraceae) with showy pale yellow flowers that grows to a height of approximately 40 inches. It is typically found in Mojave Desert Scrub on clay soils and/or volcanic tuff (CNPS 2010). It is sometimes associated with drainages but has also been found on hill slopes. Known occurrences range in elevation from 900 feet to 3,160 feet. It is State listed as Rare, has no Federal listing status, is considered a Special-Status plant by BLM, and is included on CNPS List 1B.2, indicating that it is rare, threatened or endangered in California and elsewhere, and fairly endangered in California.

Red Rock tar plant is only known to occur in California. All but one known occurrence of this plant are in Red Rock Canyon, Kern County, over 20 miles north of the Project area (CCH 2010). The other occurrence is farther to the north in Fresno County.

There is only marginally suitable habitat for Red Rock tarplant in the Project area. Botanical surveys conducted by GANDA during the blooming period for Red Rock tar plant, April to November, did not detect any tar plants (*Deinandra* spp. or *Hemizonia* spp.) on the Project area.

Mojave tarplant (*Deinandra mohavensis*)

Mojave tarplant is an annual tarplant in the Sunflower family with sessile clusters of small yellow flowers. It grows to a height of approximately 36 inches tall, and is typically found in Chaparral, Coastal Scrub, Riparian Scrub and mesic community types, in washes or around springs at elevations between 1,800 and 4,000 feet (CNPS 2010). It is State listed and Endangered, has no Federal listing status, is considered a Special-Status plant by BLM, and is included on CNPS List 1B.3, indicating that it is rare, threatened or endangered in California and elsewhere, but not very endangered in California.

In California, Mojave tarplant is known to occur in Kern, San Bernardino, Riverside, and San Diego counties. The closest known occurrence of Mojave tar plant is over 20 miles north of the Project area near a spring on Mount Cross in Jawbone Canyon (CCH 2010). There are other known occurrences in Kelso Valley, over 20 miles north of the Project area. These occurrences were found in drainages and on low hillslopes near drainages on granitic substrate within a recent burn (CCH 2010).

Suitable habitat for this species occurs on the Project area in washes and/or drainages. Botanical surveys conducted by GANDA during the blooming period for Mojave tarplant, June to October, did not detect any species of the genus on the Project area.

Limestone dudleya (*Dudleya calcicola*)

Limestone dudleya is a perennial herb in the Stonecrop family (Crassulaceae) with fleshy leaves in a basal rosette. It is typically found in Chaparral and Pinyon and Juniper Woodland on carbonate substrates (CNPS 2010). Known occurrences range in elevation from 1,640 to 8,528 feet. It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list.

Limestone dudleya is endemic to California and has been found in Inyo, Kern, and Tulare counties (CNPS 2010). The nearest known location to the Project area is in the southern Paiute Mountains, approximately twenty miles north of the Project area (CCH 2010).

Only a limited amount of suitable habitat for this species is present in the western portion of the Project area. Botanical surveys conducted by GANDA during the blooming period of limestone dudleya, April to August, did not detect the species within the Project area. No species of this genus were observed.

Brandegee's Eriastrum (*Eriastrum brandegeeae*)

Brandegee's eriastrum is an annual species in the Phlox family (Polemoniaceae) that is between 2 and 8 inches in height with small, generally blue flowers. It is primarily known to occur in the inland coastal ranges of central and northern California. In the coastal ranges it has often been found on volcanic soils in open rocky areas within the Chaparral and Cismontane vegetation types, at elevations between 1,000-3,380 feet (CNPS 2010). It has no State or Federal listing status, but is considered a Special-Status plant by BLM and is included on CNPS List 1B.2, indicating that it is rare, threatened or endangered in California and elsewhere, and fairly endangered in California.

Brandegee's eriastrum has only been reported at two locations in Kern County. Both of these occurrences are about 15 miles north of Project area. A population of 10 plants was reported on an east facing slope off Jawbone Canyon road, just 2 miles east of the intersection with Kelso Valley road, and a second occurrence of 2 plants was reported approximately ½ a mile east of Kelso Valley Road, 1 mile north of the junction with Jawbone Canyon Road (CCH 2010). Neither record is currently included in CNDDB or CNPS records. It is likely that these occurrences are actually Tracy's eriastram (*Eriastrum tracyi*), a species which was omitted from Hickman (1993), see below.

Botanical surveys conducted by GANDA during the blooming period of Brandegee's eriastrum, April to August, did not detect the species within the Project area. Only the more common species *E. densifolium, E. diffusum,* and *E. sapphirinum* were observed. Brandegee's Eriastrum is distinguished from these similar species by its anthers that do not extend beyond the corolla sinus, by the length of the filaments relative to the anthers and by the relative length of the corolla lobes (Gowen 2008).

Tracy's eriastrum (*Eriastrum tracyi*)

Tracy's eriastrum is an annual species in the Phlox family that is up to 8 inches in height with small, generally blue flowers. It is primarily known to occur in Chaparral and Cismontane vegetation types, at elevations between 1,040 to 3,220 feet (CNPS 2010). Tracy's eriastrum has recently been resurrected as a species (Gowen 2008). It was first described by Mason (1945), and later combined with Brandegee's eriastrum in the Jepson manual (Hickman 1993). It is State listed as rare, has no Federal listing status, is considered a Special-Status plant by BLM, and is included on CNPS List 1B.2, indicating that it is rare, threatened or endangered in California and elsewhere, and fairly endangered in California.

Recent investigations of herbarium records have determined that six records of Great Basin woollystar (*E. sparsiflorum*) within Kern County are actually Tracy's eriastrum. The closest reported occurrence of this species is along highway 58 near Tehachapi, about 10 miles west of the Project area.

Suitable habitat for Tracy's eriastrum occurs in the Project area. Botanical surveys conducted by GANDA during the blooming period of Tracy's eriastrum, June to July, did not detect the species within the Project area. Only the more common species *E. densifolium, E. diffusum,* and *E. sapphirinum* were observed. Tracy's Eriastrum is distinguished from these similar species by its anthers that do not extend beyond the corolla sinus, by the length of the filaments relative to the anthers and by the relative length of the corolla lobes (Gowen 2008). It can be distinguished from Brandegee's eriastrum by its wider corolla lobes and shorter stamens (Gowen 2008).

Pine fritillary (*Fritillaria pinetorum*)

Pine fritillary is a bulbiferous herb in the Lily family (Liliaceae) with spreading, mottled purple-yellow/green flowers. It is typically found in Chaparral, Lower Montane Coniferous Forest, Pinyon and Juniper Woodland, Subalpine Coniferous Forest, and Upper Montane Coniferous Forest in shady sites on granitic or metamorphic substrates (CNPS 2010). Known occurrences range in elevation from 5,906 to

10,827 feet. It has no State or Federal listing status, but is considered a Plant of Interest by BLM and is included on CNPS List 4.3, a watch list.

In California, pine fritillary has been found in Fresno, Kern, Los Angeles, Mono, Santa Barbara, San Bernardino, Tulare, and Ventura counties (CNPS 2010; CCH 2010). The closest known location to the Project area on Tehachapi Mountain, approximately five miles west of the Project area (CCH 2010).

Although limited suitable habitat is present in the Project area within California Juniper Woodland and Joshua Tree Woodland, botanical surveys conducted by GANDA during the blooming period of pine fritillary, May to July, did not detect the species within the Project area. No species of this genus were observed..

Golden goodmania (*Goodmania luteola*)

Golden goodmania is a small, spreading annual herb in the Knotweed family that is thinly hairy throughout and has small yellow flowers. It is typically found in Mojavean Desert Scrub, Meadows and Seeps, Playas, and Valley and Foothill Grassland on alkaline or clay substrates (CNPS 2010). Known occurrences range in elevation from 65 to 7,216 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, golden goodmania has been found in Fresno, Inyo, Kern, Los Angeles, Madera, Mono, and Tulare counties (CNPS 2010). The nearest known location to the Project area is from Edwards Air Force Base, approximately 20 miles east of the Project area (CCH 2010).

Marginal habitat for golden goodmania occurs in the Project area, but botanical surveys conducted by GANDA during the blooming period of golden goodmania, April to August, did not detect the species within the Project area. No similar species were observed.

Tehachapi monardella (*Monardella linoides ssp. oblonga*)

Tehachapi monardella is a perennial herb in the Mint family (Lamiaceae) with bracted heads of whitish, lavender, or pale purple flowers. Its typical habitats include Lower Montane Coniferous Forest, Upper Montane Coniferous Forest, and Pinyon and Juniper Woodland, where it is found on dry slopes with decomposed granitic soils, and in roadside disturbed areas at elevations between 5,560 and 8,100 feet (CNDDB 2010). Tehachapi monardella has no State or Federal listing status, but is considered a Special-Status plant by BLM and is included on CNPS List 1B.3, indicating that it is rare, threatened or endangered in California and elsewhere, but is not very endangered in California (CNPS 2010).

In California, Tehachapi monardella has been found in Kern, Tulare, and Ventura counties (CNPS 2010). There are no records for this species on the Mojave or Monolith quads and the closest CNDDB record is from 1889, approximately 10.4 mi west of the Project area on the Tehachapi South quad. GANDA botanists recently recorded this species on an adjacent AOCM Project, 7 mi W of the Sun Creek Project area (GANDA 2010).

Although some suitable habitat is present in the Project area, botanical surveys conducted by GANDA during the blooming period of Tehachapi Monardella, June to August, did not detect the species within the Project area. No species of this genus were observed.

Piute Mountains navarretia (*Navarretia setiloba*)

Piute Mountains navarretia is an annual herb in the Phlox family. It is typically found in Cismontane Woodland, Pinyon and Juniper Woodland, and Valley and Foothill Grassland vegetation communities in clay or gravelly loam substrates (CNPS 2010). Known occurrences range in elevation from 1,000 to

6,930 feet. It has no State or Federal listing status, but is considered a special-status plant by BLM and is included on CNPS List 1B.1, indicating that it is rare, threatened or endangered in California and elsewhere, and seriously endangered in California.

In California, Piute Mountains navarretia is endemic to Kern, Los Angeles, and Tulare counties (CNPS 2010). There are records of this species within the Monolith quadrangle which contains the Project area (CNPS 2010).

Although suitable habitat is present in the Project area, botanical surveys conducted by GANDA during the blooming period of Piute Mountains navarretia, April to July, did not detect the species. No species of this genus were observed.

Mojave fish-hook cactus (*Sclerocactus polyancistrus*)

Mojave fish-hook cactus is a small cylindrical (4-12 inches tall by 2-3 inches wide), unbranched, cactus with clusters of 9-11 hooked spines and rose to magenta colored flowers (Hickman 1993). It is typically found in Joshua Tree Woodland, Great Basin Scrub, and Mojavean Desert Scrub plant community types on well-drained soil, rocky gravelly mesas, slopes and outcrops, often of calcareous substrate (CNPS 2010). It has been reported to occur at elevations between 1,800 and 7,500 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

Mojave fish-hook cactus has been reported in California in the following counties; Inyo, Kern, and San Bernardino (CNPS 2010). There is only one occurrence on record for Kern County, which is over 25 miles north of the Project area in Red Rock Canyon (CCH 2010).

Although suitable habitat for this species is present in the Project area within Creosote Bush Scrub and Joshua Tree Woodland, the species was not observed during botanical surveys conducted by GANDA during the flowering period, April to July. No species of this genus were observed during the surveys.

Piute Mountains jewel-flower (*Streptanthus cordatus* var. *piutensis*)

Piute Mountains jewel-flower is a 6-inch to 2.5-foot tall perennial herbaceous plant in the Mustard family (Brassicaceae) with clusters of thick obovate basal leaves, and clasping lanceolate upper leaves with few to many stalks of ½-inch long purple flowers that can have green or yellow sepals (Hickman 1993). Piute Mountains jewel-flower is known to occur in Broadleafed Upland Forests, Closed-Cone Coniferous Forest, and Pinyon and Juniper Woodland plant community types along roadbanks, cliffs, rock outcrops, and sometimes on metamorphic-red clay soils. Known occurrences range in elevation from 3,600 to 5,725 feet (CNPS 2010). It has no State or Federal listing status, but is considered a special-status plant by BLM and is included on CNPS List 1B.2, indicating that it is rare, threatened or endangered in California and elsewhere, and fairly endangered in California.

Piute Mountains jewel-flower is endemic to California and has only been reported in Kern County. The closest occurrence of Piute Mountains jewel-flower to the Project area is near Cache Peak 10 miles north of the Project area.

Limited suitable habitat for this species is present in the Project area within California Juniper Woodland. Piute Mountains jewel-flower was not observed during botanical surveys conducted by GANDA during the flowering period, May to July. No species of this genus were observed during the surveys.

4.3 California Desert Native Plants Act

Opuntia basilaris is covered under the CDNPA. Of the total 1094 *Opuntia basilaris* present onsite, 731 individuals were identified as common beavertail cactus, and 363 were identified as the State and Federal

listed Bakersfield cactus. Each cactus was mapped with a Trimble GeoXH GPS unit, but only the positions of Bakersfield cactus are presented in Figure 2.

The CDNPA-covered species, Joshua tree and silver cholla, occur throughout the site, but were not mapped pending finalization of the Project design. At the time of the surveys, the Project boundaries consisted of large continuous blocks of land, but the final Project will disturb only relatively narrow turbine corridors and access roads. Since permits and mitigation under the CDNPA will only be required for individual plants that are actually removed by the Project, CH2M HILL made the decision to restrict the mapping of the species covered under the act to the areas where actual disturbance will take place.

5.0 References

Abrams, L. 1960. *Illustrated Flora of the Pacific States*. Stanford University Press, Palo Alto, California.

Bowen, C.L. 1986. Segregation of *Opuntia treleasei* and *Opuntia treleasei* var. *kernii* from *Opuntia basilaris* var. *treleasei* (Cactaceae). Unpublished draft manuscript, 9 pp.

California Department of Fish and Game (CDFG). Nov. 2009. Protocol for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities. Sacramento, CA. http://www.dfg.ca.gov/bdb/pdfs/guideplt.pdf.

California Department of Water Resources (CDWR). 2010. Precipitation/ Snow information for Tehachapi, CA (THH). Division of Flood Management. Available at: http://cdec.water.ca.gov/cgiprogs/profile?s=THH&type=precip

California Native Plant Society (CNPS). 2001. Botanical survey guidelines of the California Native Plant Society. 9 December 1983 / Revised 2 June 2001.

California Native Plant Society (CNPS). 2010. Inventory of rare and endangered plants of California (online edition, version 7.07c). Accessed at: http://www.cnps.org/inventory

California Natural Diversity Database (CNDDB). 2010. RareFind3, version 3.0.5. Electronic database. Sacramento, California.

Consortium of California Herbaria (CCH). Accessed June 2010. Accession results for various species. http://ucjeps.berkeley.edu/consortium/.

Coulter, J.M. 1896. Preliminary revision of the North American species of Echinocactus, Cereus, and Opuntia. Contributions of the U.S. National Herbarium

Endangered Species Recovery Program (ESRP), California State University, Stanislaus. 2006. Species account for *Opuntia basilaris* var. *treleasei*. Accessed March 5, 2010, at: http://esrp.csustan.edu/speciesprofiles/profile.php?sp=opba

Flora of North America Editorial Committee, eds. 1993. Flora of North America North of Mexico. 15+ vols. New York and Oxford. Vol. 4. Accessed February 7, 2010 at: http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=242413847

Garcia and Associates (GANDA). 2010. Alta Infill Wind Project Botanical Survey Report. July 2010.

Gowen. 2008. New taxa following a reassessment of *Eriastrum sparsiflorum* (Polemoniaceae). Madroño Vol. 55: 82-87.

Hickman, J., ed. 1993. The Jepson manual: Higher plants of California. University of California Press, Berkeley, CA.

Mason, H. L. 1945. The genus *Eriastrum* and the influence of Bentham and Gray upon the problem of generic confusion in Polemoniaceae. Madroño 8:65-91.

Munz, P. 1974. A flora of southern California. University of California Press, Berkeley, CA.

Sycamore Environmental Consultants. 2010. Botanical Inventory Report for the Sun Creek Wind Project. July. In Draft.

Twisselmann, E. C. 1967. A flora of Kern County, California. *The Waksman Journal of Biology* 25(1-2):1-395.

U.S. Fish and Wildlife Service (USFWS). 1996a. Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants. USFWS, September 23, 1996. Available at: http://www.fws.gov/sacramento/es/documents/listed_plant_survey_guidelines.htm

U.S. Fish and Wildlife Service (USFWS). 1996b. Endangered and Threatened Wildlife and Plants; Review of Plant and Animal Taxa that are Candidates for Listing as Endangered or Threatened Species; Notice of Review; Proposed Rule. Federal Register 61(40): 7596-7613.

U.S. Fish and Wildlife Service (USFWS). 1998. Recovery Plan for Upland Species of the San JoaquinValley, California. Region 1, Portland, Oregon. Accessed March 10, 2010, at: http://ecos.fws.gov/docs/recovery_plans/1998/980930a.pdf

U.S. Fish and Wildlife Service (USFWS). 2006. List of federal candidates for listing, available at: http://ecos.fws.gov/endangered/candidates/index.html

U.S. Fish and Wildlife Service (USFWS). 2010. List of federally listed threatened & endangered species which may occur in Kern, Los Angeles, and San Bernardino counties, CA. USFWS, Ventura Fish and Wildlife Office, Ventura, CA, available at: http://www.fws.gov/ventura/speciesinfo/

Personal communications

Cypher, E. California Department of Fish and Game. April, 8, 2010. Conversation with Ed Kentner and Susan Infalt regarding the identification of Bakersfield cactus.

Appendix A

Late-Season Vascular Plant Species Observed in the Sun Creek Wind Project Area

Scientific Name	Common Name
Dicots	
Asteraceae	**Aster family**
Ambrosia acanthicarpa	flatspine bur ragweed
Artemisia dracunculus	tarragon
Chrysothamnus teretifolius	needle leaved rabbitbrush
Gutierrezia sarothrae	broom snakeweed
Lessingia filaginifolia	California aster
Stephanomeria pauciflora	brownplume wirelettuce
Cactaceae	**Cactus family**
Opuntia basilaris var. *treleasei*	Bakersfield Cactus
Chenopodiaceae	**Goosefoot family**
Salsola tragus	prickly Russian thistle
Hydrophyllaceae	**Waterleaf family**
Phacelia tanacetifolia	lacy phacelia
Polemoniaceae	**Phlox family**
Eriastrum sapphirinum	sapphire woollystar
Polygonaceae	**Buckwheat family**
Eriogonum baileyi var. *baileyi*	Bailey's buckwheat
Eriogonum brachyanthum	shortflower buckwheat
Eriogonum deflexum	flatcrown buckwheat
Eriogonum heermannii var. *heermannii*	Heermann's buckwheat
Eriogonum nidularium	birdnest buckwheat
Eriogonum plumatella	yucca buckwheat
Scrophulariaceae	**Figwort family**
Penstemon incertus	Mojave beardtongue

Appendix B

Bakersfield Cactus Locations in the Sun Creek Wind Project Area

Label	Coordinates UTM NAD 83
OPBAT-1	11S 390941.748 3884614.614
OPBAT-2	11S 390942.972 3884617.494
OPBAT-3	11S 391007.491 3885061.185
OPBAT-4	11S 390838.689 3884523.231
OPBAT-5	11S 391120.775 3885795.779
OPBAT-6	11S 390847.104 3884971.215
OPBAT-7	11S 390779.722 3885118.273
OPBAT-8	11S 390411.746 3884211.733
OPBAT-9	11S 391059.31 3886193.711
OPBAT-10	11S 388371.916 3885808.608
OPBAT-11	11S 390589.225 3884908.798
OPBAT-12	11S 386974.589 3883920.276
OPBAT-13	11S 388218.705 3886859.229
OPBAT-14	11S 388231.63 3886823.61
OPBAT-15	11S 387951.569 3887302.033
OPBAT-16	11S 387947.814 3887467.173
OPBAT-17	11S 389211.651 3884720.159
OPBAT-18	11S 389209.165 3884718.84
OPBAT-19	11S 389380.628 3885210.953
OPBAT-20	11S 389360.716 3885192.02
OPBAT-21	11S 389228.123 3885084.465
OPBAT-22	11S 389273.304 3885079.612
OPBAT-23	11S 389438.074 3885354.988
OPBAT-24	11S 386872.443 3884208.433
OPBAT-25	11S 387000.167 3884373.834
OPBAT-26	11S 387055.038 3884412.307
OPBAT-27	11S 387242.83 3884714.659
OPBAT-28	11S 387252.675 3884735.765
OPBAT-29	11S 387006.134 3884467.994
OPBAT-30	11S 387005.456 3884465.11
OPBAT-31	11S 387000.626 3884449.587
OPBAT-32	11S 386940.996 3884428.894
OPBAT-33	11S 386902.27 3884347.466
OPBAT-34	11S 386914.532 3884336.219
OPBAT-35	11S 386882.481 3884346.551
OPBAT-36	11S 386879.213 3884361.213
OPBAT-37	11S 386878.525 3884366.239
OPBAT-38	11S 386663.298 3884282.393
OPBAT-39	11S 386806.508 3884440.146
OPBAT-40	11S 386809.164 3884445.054
OPBAT-41	11S 386801.426 3884484.559
OPBAT-42	11S 386809.748 3884470.626
OPBAT-43	11S 386811.856 3884458.356
OPBAT-44	11S 386817.346 3884454.983

Label	Coordinates UTM NAD 83
OPBAT-45	11S 386900.096 3884636.307
OPBAT-46	11S 386720.04 3884405.377
OPBAT-47	11S 386721.86 3884404.704
OPBAT-48	11S 386646.625 3884361.084
OPBAT-49	11S 386650.351 3884357.158
OPBAT-50	11S 386644.132 3884353.903
OPBAT-51	11S 386648.554 3884295.442
OPBAT-52	11S 386612.55 3884320.997
OPBAT-53	11S 386606.065 3884309.504
OPBAT-54	11S 386605.979 3884286.687
OPBAT-55	11S 386444.238 3884314.846
OPBAT-56	11S 386500.129 3884387.098
OPBAT-57	11S 386929.996 3883693.663
OPBAT-58	11S 386926.776 3883690.391
OPBAT-59	11S 386895.67 3883490.566
OPBAT-60	11S 386934.865 3883415.536
OPBAT-61	11S 386993.05 3883378.138
OPBAT-62	11S 386983.3 3883217.131
OPBAT-63	11S 386885.814 3883300.938
OPBAT-64	11S 386823.492 3883349.727
OPBAT-65	11S 386802.065 3883429.957
OPBAT-66	11S 386709.18 3883352.918
OPBAT-67	11S 386764.433 3883423.453
OPBAT-68	11S 386760.043 3883423.811
OPBAT-69	11S 386668.829 3883247.131
OPBAT-70	11S 386779.221 3883265.85
OPBAT-71	11S 386581.867 3883242.092
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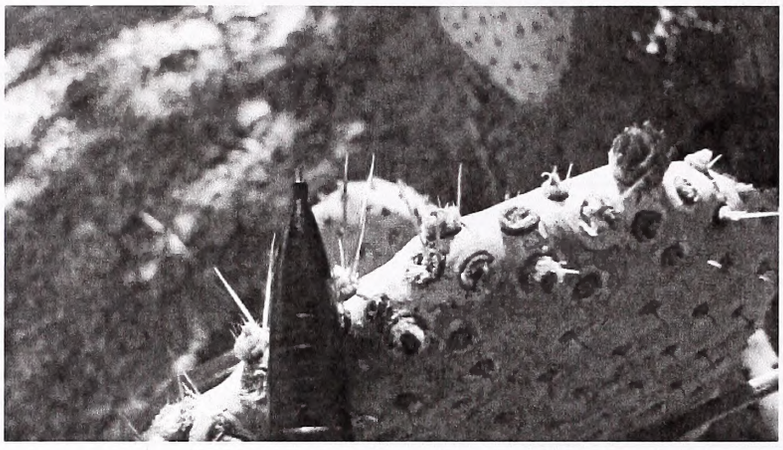
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Appendix C

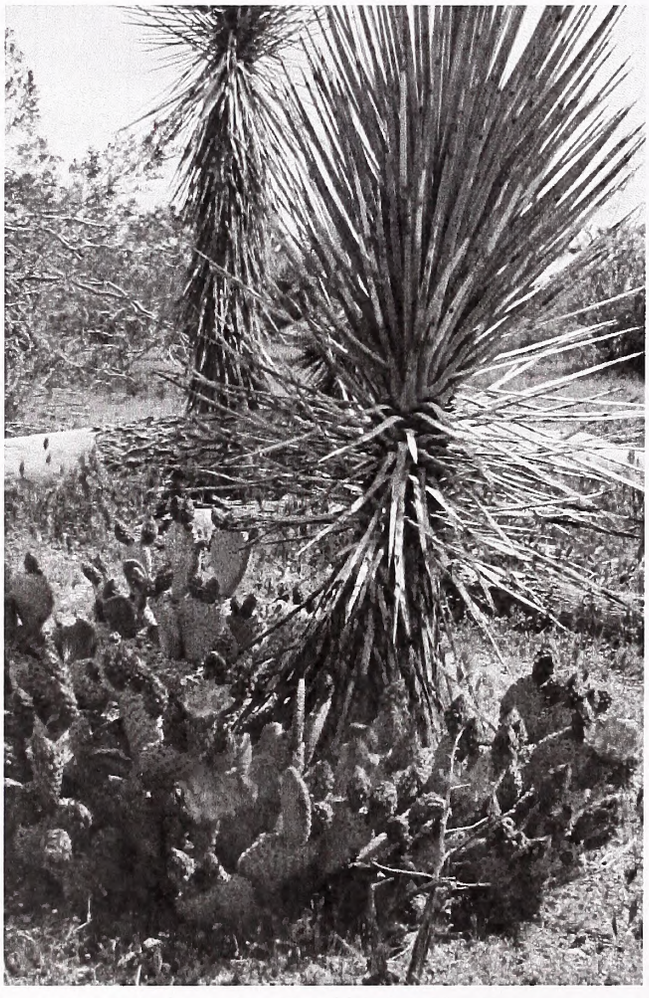
Special-Status Plant Locations in the Sun Creek Wind Project Area

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PEPR-4	Adobe yampah	*Perideridia pringlei*	1	11S 389266.132 3885070.211
PEPR-5	Adobe yampah	*Perideridia pringlei*	1	11S 389116.312 3884914.368
PEPR-6	Adobe yampah	*Perideridia pringlei*	5	11S 389248.347 3885073.29

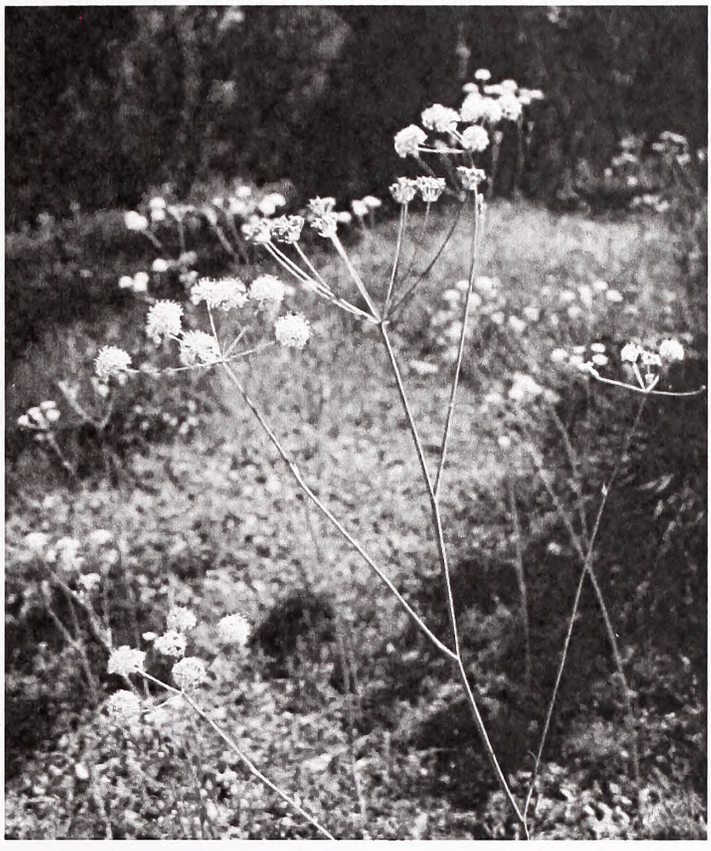
Appendix D
Representative Photos



Representative close-up photograph of spines on the Federally and State Endangered, CNPS List 1B.3 Bakersfield cactus (*Opuntia basilaris* var. *treleasei*).



Representative photograph of blooming *Opuntia basilaris*.



Representative close-up photograph of CNPS List 4.3 Adobe yampah (*Perideridia pringlei*).

Appendix D-26

Botanical Inventory Report Spring 2011

Appendix D-26

Botanical Inventory Report Spring 2010

Alta East Wind Energy Project
Spring 2011
Botanical Survey Report

Prepared for:
CH2M Hill Engineers, Inc.
155 Grand Avenue
Oakland, CA 94612

Prepared by:
Garcia and Associates (GANDA)
516 Civic Center Drive
Oceanside, CA 92054

June 2011

GANDA

Executive Summary

Botanical surveys for the approximately 917-acre survey area for the Alta East Wind Energy Project were conducted by Garcia and Associates (GANDA) on April 18-20, May 9-13, and 16, 2011. The purpose of the surveys was to locate and map special-status plant species, species afforded protection under the California Desert Native Plants Act (CDNPA), "large" Joshua trees (CH2M Hill 2010a), and invasive plant species. The transect-based botanical surveys following the guidelines of the California Department of Fish and Game (CDFG 2009a), the U.S. Fish and Wildlife Service (USFWS 1996a), and the California Native Plant Society (CNPS 2001) were initiated during the spring 2011 flowering period. A second round of late-season surveys for later-blooming species is planned for June of 2011 in order to complete the surveys to protocol-level.

Pre-field research was conducted to select special-status with potential to be found within the Project site. The list of potentially occurring special-status plants was derived from several sources, including U.S. Geological Survey 7.5' quadrangle-based searches of the California Natural Diversity Database (CNDDB 2011a), the CNPS on-line Inventory (2011), and other sources. Fifty-six special-status were determined to have potential to occur within the Project site based on habitat preferences and known distribution.

Three special-status were observed within the Project site: The Federal and State endangered Bakersfield cactus (*Opuntia basilaris* var. *treleasei*), pale-yellow layia (*Layia heterotricha*: CNPS List 1B.1), and adobe yampah (*Perideridia pringlei*: CNPS List 4.3). A total of 112 individuals of Bakersfield cactus were mapped within the Project survey area. Three sites, each with a single plant were recorded for pale-yellow layia. Based on the lower than average seasonal rainfall totals in the vicinity of the Project, and observations of the low germination rates in other annual species in the area, it is likely that germination for pale-yellow layia was poor in 2011 and that larger populations occur in the area in favorable years. Areas of suitable clay soil habitat for pale-yellow layia were mapped in the vicinity of the observed individuals. Two adobe yampah plants in two separate locations were observed.

Inventoried and mapped species afforded protection under the CDNPA included 373 silver cholla (*Opuntia echinocarpa*), 728 beavertail cactus (*O. b.* var. *basilaris*), 112 Bakersfield cactus, and 1,433 chaparral yucca (*Yucca whipplei*).

A total of 1,135 Joshua trees (*Yucca brevifolia*) meeting the minimum size criteria for "large" trees were mapped during the surveys.

Ten species of invasive plant species were observed onsite. Infestations of six of these species were mapped and population numbers were estimated. The remaining four species are widespread and common throughout the Project area and were therefore not mapped.

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Appendices

Appendix A. Vascular Plant Species Observed in the Project area.
Appendix B. Bakersfield Cactus locations in the Project area.
Appendix C. Special-status plant species locations in the Project area.
Appendix D. Morphological characteristics of *Opuntia basilaris* plants occurring in the Project area.
Appendix E. Descriptions of special-status plants not observed, but with the potential to occur in the Project area
Appendix F. Representative photographs.

1.0 Introduction

Garcia and Associates, as a subcontractor to CH2M Hill Engineers, Inc. (CH2M HILL), was tasked with conducting botanical surveys for the Alta East Wind Energy Project (Project). The purpose of the botanical surveys was to locate and map occurrences of special-status and invasive plant species occurring within the proposed Alta East Wind Energy Project area. GANDA was not tasked with mapping or describing the vegetation communities occurring on the Project, as these have been reported previously (CH2M Hill 2010b).

1.1 Project description

Alta Windpower Development, LLC, proposes to develop the Alta East Wind Energy Project in southeastern Kern County, California. The Project area is located within the Tehachapi Wind Resource Area, a region recognized by the U.S. Department of Energy as having high wind energy resources. The Project will be located on Bureau of Land Management and private land. At full build-out, the Project is expected to produce an overall net generating capacity of up to 411 megawatts using up to 137 wind turbine generators. Associated supporting infrastructure including access roads, generator tie-in circuits, and transmission lines would also be constructed.

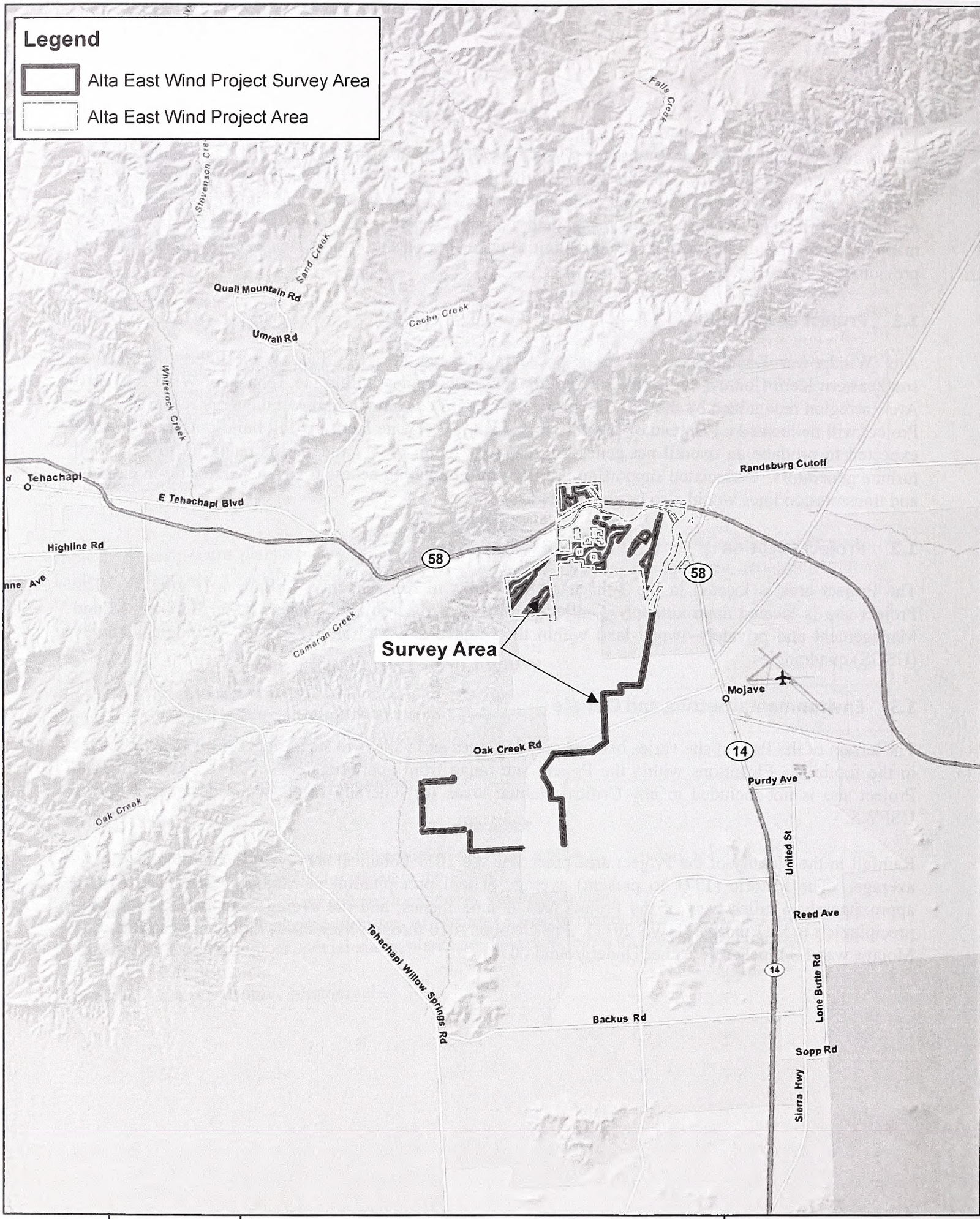
1.2 Project Location

The Project area is located in the Tehachapi Mountains in Kern County, California (Figure 1). The Project site is located approximately 4 miles northwest of the Mojave, California, on Bureau of Land Management and privately-owned land within the Mojave and Monolith 7.5' U.S. Geological Survey (USGS) quadrangles.

1.3 Environmental Setting and Climate

The terrain of the Project site varies between gentle slopes and valleys to steep ridges, hills, and drainages in the foothills. Elevations within the Project site range from approximately 3,000 to 3,900 feet. The Project site is not included in any Critical Habitat areas for federally listed plants designated by the USFWS.

Rainfall in the vicinity of the Project area preceding the 2011 botanical surveys was significantly below average. The historic (1971 to present) average annual precipitation in Mojave, California, located approximately 6 miles west of the Project area is 6.63 inches, and the average October through May precipitation is 5.87 inches. (NWS 2011). For October 2010 through May 2011, the total precipitation in Mojave was 1.34 inches (Weather Underground 2011).



GANDA

Project Location

Source: ESRI, World Street Map, GANDA GIS 2011

Kilometers
0 4
Miles
0 4

Figure 1. Project location map.

Alta East Wind Project

Kern County, CA

June 2011

2.0 Methods

2.1 Special-status plants

2.1.1 Pre-field research and literature review

Prior to conducting the botanical surveys research was conducted to identify special-status plant species with potential to occur on the Project site. For each potentially occurring species, information was compiled on conservation status, distribution, habitat characteristics, flowering time, presence in the Project region, and characteristics used in field identification.

A plant was considered to be of special status if it met one or more of the following criteria:

- Federally or state-listed, proposed, or candidate for listing, as rare, threatened or endangered (USFWS 1996b, 2006, 2011; CNDDB 2011a, CNPS 2011); or
- Special Plant as defined by the CDFG CNDDB (CDFG 2011b); or
- Designated by the California Native Plant Society (CNPS) in its *Inventory of Rare and Endangered Plants of California* (CNPS 2011)

A species was determined to have potential to occur within the Project area if its known or expected geographic range includes the Project area or the vicinity of the Project area, and if its known or expected habitat is found within or near the Project area. For this project, the Project area vicinity includes the western Mojave Desert, Tehachapi Mountains, and southern Sierra Nevada.

A preliminary list of potentially occurring special-status plants was derived from several sources. Quadrangle-based searches of the CNPS Inventory (2011) and the CNDDB RareFind3 database (2011a) were used to identify potentially occurring special-status plants. The 7.5' USGS quadrangles containing the Project area (Mojave and Monolith), and 12 additional surrounding USGS 7.5' quadrangles (Sanborn, Soledad Mtn, Willow Springs, Tehachapi NE, Cache Peak, and Mojave NE) were included in the searches. A search of the CNPS database for List 1-3 taxa in these quadrangles returned 15 taxa. Four additional taxa were added to this list, based on recent observations at nearby project sites, for a total of 19. The CNDDB database search failed to return any additional CNPS List 1-3 taxa. CNPS List 4 species with the potential to occur in the vicinity of the Project were identified by searching the CNPS Inventory for all of Kern County. Seventy-one taxa were identified in this search. The combined List 4 and List 1-3 searches returned a total of 90 taxa, but only 45 of these were retained for potential occurrence in the project area. The others were excluded from consideration, because they either occurred well outside of the known distribution of the taxon, occurred in habitats not represented in the project area, occurred well outside of the known elevational range of the species, or were specific to soil types not believed to occur in the project areas.

Table 1 summarizes information on the 45 special-status plants determined to have the potential to occur on the Project site. The table includes information on flowering time, conservation status, habitat preferences, geographic distribution, elevation, and known locations in the vicinity of the Project area.

Table 1. Special-status plant species with the potential to occur on the Alta East Wind Energy Project.

Taxon	Status Fed/State/BLM/CNPS	Flowering period	Habitat and elevation	Potential for occurrence in the Project area
Allium atrorubens var. *cristatum* Inyo onion	--/--/--/4.3	Apr-Jun	Joshua Tree Woodland, Pinyon-Juniper Woodland - sandy or rocky sites. 3,940 - 8,400 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 42 mi northeast of the Project area in the Owens Peak watershed (CCH 2011).
Allium shevockii Spanish needle onion	--/--/SS/1B.3	May-Jun	Pinyon-Juniper Woodland, Upper Montane Coniferous Forest - in soil pockets on rock outcrops and talus slopes; bulbs mostly on margins of outcrops. 2,790 - 8,200 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 8 mi west of the Project area near upper Horse Canyon about 4 miles upstream from Sand Canyon (CNDDB 2011a).
Androsace elongata ssp. *acuta* California androsace	--/--/--/4.2	Mar-Jun	Chaparral, Cismontane Woodland, Coastal Sage Scrub, Valley and Foothill Grassland - highly localized and often overlooked little plant. 490 - 3,940 ft.	**Unlikely.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 20 mi west of the Project area in the Tehachapi Mountains near Keene Station (CCH 2011).
Astragalus hornii var. *hornii* Horn's milk-vetch	--/--/SS/1B.1	May-Oct	Meadows and Seeps, Playas - lake margins, alkaline sites. 200 - 2,790 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 15 mi south of the Project area in Willow Springs. (CNDDB 2011a).
Calochortus striatus alkali mariposa lily	--/--/SS/1B.2	Apr-Jun	Chaparral, Chenopod Scrub, Mojavean Desert Scrub, Meadows - alkaline meadows and ephemeral washes. 230 - 5,230 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 12 mi south of the Project area along Sierra Highway between Sopp Road and Backus Road (CNDDB 2011a).
Camissonia kernensis ssp. *kernensis* Kern County evening-primrose	--/--/--/4.3	Mar-May	Joshua Tree Woodland, Pinyon and Juniper Woodland - sandy or gravelly granitic soils. 2,590 - 6,990 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 4 mi south of the Project area about 3 miles west of Hwy 14 on Oak Creek Drive (CCH 2011).
Canbya candida white pygmy-poppy	--/--/--/4.2	Mar-Jun	Joshua Tree Woodland, Mojavean Desert Scrub - sandy places. 1,970 - 4,790 ft.	**Unlikely.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 4 mi east of the Project area 2 miles north of Mojave. (CNDDB 2011a).
Castilleja plagiotoma Mojave paintbrush	--/--/--/4.3	Apr-Jun	Great Basin Scrub, Pinyon-Juniper Woodland - alluvial fans. 980 - 8,200 ft.	**Unlikely.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 6 mi west of the Project area near the intersection of Sand Canyon and Tranquility Roads (CCH 2011).

Taxon	Status Fed/State/BLM/CNPS	Flowering period	Habitat and elevation	Potential for occurrence in the Project area
Chamaesyce vallis-mortae Death Valley sandmat	--/--/--/4.2	May-Oct	Mojavean Desert Scrub - sandy or gravelly sites. 750 - 4,790 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. Possibly North Sky Records (GANDA 2010)
Chorizanthe spinosa Mojave spineflower	--/--/--/4.2	Mar-Jul	Chenopod Scrub, Mojavean Desert Scrub. 20 - 4,270 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 5 mi southeast of the Project area in Mohave (CCH 2011).
Clarkia xantiana ssp. *parviflora* Kern Canyon clarkia	--/--/--/4.2	May-Jun	Cismontane Woodland, Great Basin Scrub - dry slopes. 2,300 - 11,880 ft.	**Unlikely.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 26 mi northwest of the Project area about 2 mi west of Kelso Valley Road, off of road to Piute Mountain (CNDDB 2011a).
Cordylanthus rigidus ssp. *brevibracteatus* short-bracted bird's-beak	--/--/--/4.3	Jul-Aug	Chaparral, Lower Montane Coniferous Forest, Pinyon-Juniper Woodland, Upper Montane Coniferous Forest - in openings, on granitic soil. 3,280 - 8,500 ft.	**Unlikely.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 12 mi west of the Project area in Antelope Canyon south of Tehachapi (CCH 2011).
Deinandra mohavensis Mojave tarplant	--/SE/SS/1B.3	Jun-Oct(Jan),	Riparian Scrub, Chaparral - low sand bars in river bed; mostly in riparian areas or in ephemeral grassy areas. 2,110 - 5,280 ft.	**Unlikely.** The species was not observed in surveys conducted during the flowering period. Possibly North Sky Records (GANDA 2010)
Delphinium gypsophilum ssp. *gypsophilum* gypsum-loving larkspur	--/--/--/4.2	Feb-May	Chenopod Scrub, Valley and Foothill Grassland, Cismontane Woodland - on open slopes and in fields. 330 - 3,260 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 3 mi west of the Project area on the north slope of Tehachapi Pass (CCH 2011).
Delphinium parryi ssp. *purpureum* Mt. Pinos larkspur	--/--/--/4.3	May-Jun	Pinyon-Juniper Woodland, Mojavean Desert Scrub, Chaparral. 3,280 - 8,530 ft.	**Unlikely.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 12 mi north of the Project area near Emerald Mountain (GANDA 2010).
Dudleya abramsii ssp. *calcicola* limestone dudleya	--/--/--/4.3	Apr-Aug	Chaparral, Pinyon-Juniper Woodland - rocky places on limestone. 1,640 - 8,530 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 17 mi northwest of the Project area about 3 km north of Twin Oaks in the southern Piute Mtns (CCH 2011).

Taxon	Status Fed/State/BLM/CNPS	Flowering period	Habitat and elevation	Potential for occurrence in the Project area
Eriastrum hooveri Hoover's eriastrum	DL/--/--/4.2	Mar-Jul	Chenopod Scrub, Valley and Foothill Grassland, Pinyon and Juniper Woodland - on sparsely vegetated alkaline alluvial fans; also in the temblor range on sandy soils. 160 - 3,000 ft.	**Unlikely.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 22 mi south of the Project area on the southwest edge of Rosamond Dry Lake (CCH 2011).
Eriastrum tracyi Tracy's eriastrum	--/SR/SS/1B.2	Jun-Jul	Chaparral, Cismontane Woodland - gravelly shale or clay; often in open areas. 1,040 - 3,700 ft.	**Possible.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 12 mi north of the Project area about 1.5 miles northeast of Emerald Mountain (CNDDB 2011a).
Ericameria albida white-flowered rabbitbrush	--/--/--/4.2	Jun-Nov	Chenopod Scrub, Meadows and Seeps, saline or Alkaline Playas. 980 - 6,400 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 50 mi northeast of the Project area in Indian Wells Valley (CCH 2011).
Eriogonum kennedyi var. *pinicola* Kern buckwheat	--/--/SS/1B.1	May-Jun(Jul),	Chaparral, Pinyon and Juniper Woodland - open places on clay soil. 4,400 - 6,400 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 4 mi northeast of the Project area on a ridge south of Pine Tree Canyon (CNDDB 2011a).
Eriophyllum mohavense Barstow woolly sunflower	--/--/SS/1B.2	(Mar),Apr-May	Desert Chenopod Scrub, Mojavean Desert Scrub, Desert Playas - mostly in open, silty or sandy areas w/saltbush scrub, or creo. bush scrub. barren ridges or margins of playas. 1,640 - 3,150 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is Edwards Air Force Base 20 mi E of the project area (CNDDB 2011a)
Gilia interior inland gilia	--/--/--/4.3	Mar-May	Cismontane Woodland, Joshua Tree Woodland, Lower Montane Coniferous Forest - rocky sites. 2,300 - 5,580 ft.	**Unlikely.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 23 mi south of the Project area west of Lancaster at 125th St. & Calif. Hwy 138 (CCH 2011).
Gilia latiflora ssp. *cuyamensis* Cuyama gilia	--/--/--/4.3	Apr-Jun	Pinyon and Juniper Woodland - sandy flats, lower river valleys. 1,970 - 6,560 ft.	**Unlikely.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 33 mi south of the Project area in the vicinity of Ritter Ridge on the south side of the Antelope Valley (CCH 2011).
Goodmania luteola golden goodmania	--/--/--/4.2	Apr-Aug	Meadows, Mojavean Desert Scrub, Playas, Valley and Foothill Grassland - in the central valley from Madera County to Kern County. 70 - 7,220 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 21 mi east of the Project area 8 mi north of Muroc (CCH 2011).

Taxon	Status Fed/State/BLM/CNPS	Flowering period	Habitat and elevation	Potential for occurrence in the Project area
Lasthenia glabrata ssp. *coulteri* Coulter's goldfields	--/--/SS/1B.1	Feb-Jun	Coastal Salt Marshes, Playas, Valley and Foothill Grassland, Vernal Pools - usually found on alkaline soils in playas, sinks, and grasslands. 0 - 4,000 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 12 mi west of the Project area in Tehachapi (CNDDB 2011a).
Layia heterotricha pale-yellow layia	--/--/SS/1B.1	Mar-Jun	Cismontane Woodland, Pinyon-Juniper Woodland, Valley and Foothill Grassland - alkaline or clay soils; open areas. 980 - 5,590 ft.	**Present.** Three individuals were mapped at three separate locations within the 2011 survey area. Additional suitable habitat is present.
Loeflingia squarrosa var. *artemisiarum* sagebrush loeflingia	--/--/--/2.2	Apr-May	Great Basin Scrub, Sonoran Desert Scrub, Desert Dunes - sandy flats and dunes. sandy areas around clay slicks w/*Sarcobatus*, *Atriplex*, *Tetradymia*, etc. 2,300 - 5,300 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 10 mi southeast of the Project area northeast of Actin (CNDDB 2011a).
Mentzelia eremophila solitary blazing star	--/--/--/4.2	Mar-May	Mojavean Desert Scrub. 2,300 - 4,000 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 9 mi north of the Project area on the east side of Barren Ridge, about 7.5 mi northwest of California City (CCH 2011).
Microseris sylvatica sylvan microseris	--/--/--/4.2	Mar-Jun	Chaparral, Cismontane Woodland, Great Basin Scrub, Pinyon-Juniper Woodland, Valley and Foothill Grassland - sometimes on serpentine. 150 - 4,920 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 12 mi west of the Project area in Tehachapi (CCH 2011).
Mimulus pictus calico monkeyflower	--/--/SS/1B.2	Mar-May	Broadleafed Upland Forest, Cismontane Woodland - in bare ground around gooseberry bushes or around granite rock outcrops. 330 - 4,270 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 6 mi northwest of the Project area near a tributary to Cache Creek/Sand Canyon, northeast of Monolith (CNDDB 2011a).
Monardella linoides ssp. *oblonga* Tehachapi monardella	--/--/SS/1B.3	Jun-Aug	Lower Montane Coniferous Forest, Upper Montane Coniferous Forest, Pinyon-Juniper Woodland - on dry slopes of yellow pine forest, decomposed granitic soils; also in roadside disturbed areas. 2,960 - 8,130 ft.	**Absent.** The species was not observed in surveys conducted outside of the flowering period, but the species is a perennial and would have been detected. No suitable habitat is present. The nearest known location is 8 mi north of the Project area about 0.8 mi SE of Cache Peak (CCH 2011).

Taxon	Status Fed/State/BLM/CNPS	Flowering period	Habitat and elevation	Potential for occurrence in the Project area
Muilla coronata crowned muilla	--/--/--/4.2	Mar-Apr(May),	Joshua Tree Woodland, Pinyon-Juniper Woodland, Mojavean Desert Scrub - mostly on barren flats and ridges in sandy, granitic soils. 2,510 - 6,430 ft.	**Unlikely.** The species was not observed in surveys conducted during the fruiting period. The nearest known location is 7 mi west of the Project area off of Oak Creek Rd., 8.9 mi west of Mojave (CCH 2011).
Navarretia setiloba Piute Mountains navarretia	--/--/SS/1B.1	Apr-Jul	Cismontane Woodland, Pinyon-Juniper Woodland, Valley and Foothill Grassland - red clay soils, other clay soils (?), or on gravelly loam. 1,000 - 6,890 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 24 mi northwest of the Project area on Piute Mountain Road, <3 miles from the Caliente Bodfish Road (CNDDB 2011a).
Nemacladus gracilis slender nemacladus	--/--/--/4.3	Mar-May	Cismontane Woodland, Valley and Foothill Grassland - sandy or gravelly places. 390 - 6,230 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 9 mi west of the Project area in Oak Creek Canyon, 1.8 miles southwest of intersection of Oak Creek Rd and Tehachapi Willow Springs Rd (CCH 2011).
Nemacladus secundiflorus var. *secundiflorus* large-flowered nemacladus	--/--/--/4.3	Apr-Jun	Chaparral, Valley and Foothill Grassland - dry, sandy to gravelly flats and slopes. 660 - 6,560 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 45 mi north of the Project area on Greenhorn Mountain (CCH 2011).
Opuntia basilaris var. *treleasei* Bakersfield cactus	FE/SE/SS/1B.1	Apr-May	Chenopod Scrub, Valley and Foothill Grassland, Cismontane Woodland - coarse or cobbly well-drained granitic sand on bluffs, low hills, and flats within grassland. 400 - 3,760 ft.	**Present.** 112 individual plants were mapped within the 2011 botanical survey area.
Pentachaeta fragilis fragile pentachaeta	--/--/--/4.3	Mar-Jun	Chaparral, Lower Montane Coniferous Forest - sandy soils. 150 - 6,890 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 17 mi north of the Project area in Kelso Valley (CCH 2011).
Perideridia pringlei adobe yampah	--/--/--/4.3	Apr-Jun(Jul),	Chaparral, Cismontane Woodland, Pinyon and Juniper Woodland, Coastal Scrub - serpentine grassland hillsides, clay soils, seasonally wet sites. 980 - 5,910 ft.	**Present.** Two individuals were mapped in two separate locations within the 2011 botanical survey area.
Phacelia cicutaria var. *hubbyi* Hubby's phacelia	--/--/--/4.2	Apr-Jun	Chaparral, Coastal Scrub, Valley and Foothill Grassland - gravelly, rocky areas and talus slopes. 0 - 3,280 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 17 mi north of the Project area near Jawbone area (CCH 2011).

Taxon	Status Fed/State/BLM/CNPS	Flowering period	Habitat and elevation	Potential for occurrence in the Project area
Phacelia exilis Transverse Range phacelia	--/--/--/4.3	May-Aug	Meadows, Lower Montane Coniferous Forest, Upper Montane Coniferous Forest - sandy or rocky slopes, flats, meadows. 3,610 - 8,860 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 24 mi northwest of the Project area to the southeast of Piute Peak (CCH 2011).
Phacelia nashiana Charlotte's phacelia	--/--/SS/1B.2	Mar-Jun	Joshua Tree Woodland, Mojavean Desert Scrub, Pinyon-Juniper Woodland - granitic soils; sandy or rocky areas on steep slopes or flats. 1,970 - 7,220 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 9 mi northeast of the Project area on an east slope of Barren Ridge, about 4.5 miles southwest of the mouth of Pine Tree Canyon (CNDDB 2011a).
Psorothamnus arborescens var. *arborescens* Mojave indigo-bush	--/--/--/4.3	Apr-May	Riparian Scrub - desert hillsides and stony flats on granitic bedrock. 1,310 - 3,890 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 24 mi north of the Project area in Red Rock Canyon (CCH 2011).
Sclerocactus polyancistrus Mojave fish-hook cactus	--/--/--/4.2	Apr-Jul	Joshua Tree Woodland, Mojavean Desert Scrub - well-drained soil, on rocky gravelly mesas, slopes & outcrops; sometimes on limestone. 2,100 - 7,610 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 25 mi north of the Project area in Red Rock Canyon (CCH 2011).
Streptanthus cordatus var. *piutensis* Piute Mountains jewel-flower	--/--/SS/1B.2	May-Jul	Broadleafed Upland Forests, Closed-Cone Coniferous Forest, Pinyon-Juniper Woodland - along roadbanks and cliffs, metamorphic-red clay soils. 3,590 - 5,990 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 7 mi northwest of the Project area on Sweetwater Ridge southeast of Cache Peak (CNDDB 2011a).
Viola purpurea ssp. *aurea* golden violet	--/--/SS/2.2	Apr-Jun	Great Basin Scrub, Pinyon-Juniper Woodland - dry, sandy slopes. 3,280 - 6,690 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 5 mi south of the Project area near Mojave Station (CNDDB 2011a), but the plants at this location were misidentified (John Little pers. com.)

Sources:
Bureau of land Management 2010; California Native Plant Society. 2010; California Natural Diversity Database. 2010;Jepson Online Interchange. 2010; Consortium of California Herbaria 2010.

[1] **Conservation status abbreviations:**

U.S. Fish and Wildlife Service designations:

FE Endangered: Any species in danger of extinction throughout all or a significant portion of its range.
FT Threatened: Any species likely to become endangered within the foreseeable future.

California Department of Fish and Game designations:

- SE Endangered: Any species in danger of extinction throughout all or a significant portion of its range.
- ST Threatened: Any species likely to become endangered within the foreseeable future.
- SR Rare: Any species not currently threatened with extinction, but in such small numbers throughout its range that it may become endangered if its present environment worsens.

Bureau of Land Management designations:

- S Special-Status
- PI Plant of Interest

California Native Plant Society designations:

- 1B Plants rare, threatened or endangered in California and elsewhere.
- 2 Plants rare, threatened or endangered in California, but more common elsewhere.
- 3 Plants for which more information is needed – a review list.
- 4 Plants of limited distribution – a watch list.

California Native Plant Society threat categories:

- .1 Seriously endangered in California.
- .2 Fairly endangered in California.
- .3 Not very endangered in California.

[2] **Occurrence potential definitions:**

- Present: Species observed on the site.
- Likely: Species not observed on the site, but reasonably certain to occur on the site.
- Possible: Species not observed on the site, but conditions suitable for occurrence.
- Unlikely: Species not observed on the site, conditions marginal for occurrence.
- Absent: Species or suitable habitat not observed on the site during protocol-level surveys.

2.1.2 Reference site visits

Reference site visits were conducted for six species of special-status plants with potential to occur at the Project site:

Alkali Mariposa lily (*Calochortus striatus*): Several hundred plants were observed in flowering condition in Alkali Sink habitat at the intersection of Avenue E and 60th St. north of Lancaster on May 13, 2011.

Pygmy poppy (*Canbya candida*): On May 2, 2011 plants were searched for in sandy soils within Blackbrush Scrub habitat at a location near Kelso Valley where the species was observed in 2010. No pygmy poppies were found in 2011.

Death Valley sandmat (*Chamaesyce vallis-mortae*): On May 2, 2011, about a dozen plants were observed in vegetative and early flowering conduction at a site near the Kelso Valley where the species was observed in 2010.

Mojave spineflower (*Chorizanthe spinosa*): Several hundred plants were observed in flowering condition in Alkali Sink habitat at the intersection of Avenue E and 60th St. north of Lancaster on May 13, 2011.

Golden goodmania (*Goodmania luteola*): About 20 plants were observed in early flowering condition in Alkali Sink habitat at the intersection of Avenue G and 30th St., north of Lancaster on May 6, 2011.

Bakersfield cactus: On April 25, 2011, the extensive population at the Sand Ridge Preserve (CNDDB Occurrence No. 3) was visited to compare spine characteristics at a known population of Bakersfield cactus with the spine-bearing individuals located on the project site.

2.1.3 Protocol-level surveys

Transect-based protocol-level botanical surveys following the guidelines of the California Department of Fish and Game (CDFG 2009a), the USFWS (1996a), and the CNPS (2001) were conducted on April 18-20, May 9-13, and 16, 2011. The goal of the surveys was to census, map, photograph and record habitat data for every special-status plant location that was detected. Surveys were floristic in scope, meaning that all plants found in identifiable condition were identified to the taxonomic level necessary to determine their rarity or listing status. A second round of late-season surveys of habitats determined during the initial round of surveys to be suitable for later-blooming special-status species is scheduled for June of 2011.

Global positioning systems (GPS) units were used to map special-status plant species, species protected under the California Desert Native Plants Protection Act (CDNPA), and invasive weed populations. Trimble® GeoXT GPS units with sub-meter accuracy were used to map all locations of special-status plants, and some of the weed and CDNPA locations. The remaining invasive weed and CDNPA species locations were mapped with Garmin GPS units with ~3m accuracy. The Trimble GPS units were equipped with data files for navigation and with data dictionaries for data collection. Data dictionaries and field data forms were used to record locality information, the actual or estimated number of individuals observed, and habitat information.

A list of all plant species observed was compiled for the Project site (Appendix A) during the surveys. Nomenclature for scientific names follows *The Jepson Manual* (Hickman 1993), except where noted.

The ability of surveyors to detect and identify plants rapidly and accurately in the field was enhanced by a field review of the common plant species at the Project site prior to beginning the surveys. All surveyors

were provided with photo guides of targeted special-status plants and preliminary species lists compiled prior to the field surveys.

2.1.4 Bakersfield cactus mapping and identification

There is currently some scientific disagreement about the proper taxonomic characteristics that should be applied to identify the Federal and State endangered Bakersfield cactus (*Opuntia basilaris* var. *treleasei*), as opposed to the closely related variety, beavertail cactus (*O. b.* var. *basilaris*). Using identification criteria offered recently by CDFG, the listed species is very common on the project. However, using the keys and descriptions published in standard floras such as The Jepson Manual (Hickman, 1993), A California Flora (Munz and Keck 1973), and Flora of North America (FNA 1993), there are few, if any, individuals of the listed species on site. The CDFG has recently requested that varietal identification of *Opuntia basilaris* plants occurring in Kern County should use a recently-issued CDFG guidance document (Cypher 2011) that bases the taxonomic interpretation of the varieties largely on outdated or unpublished literature (e.g. Coulter 1896; Griffiths and Hare 1906; Britton and Rose 1920, and Bowen 1987). The diagnostic characteristics of Bakersfield cactus listed in the guidance document are reproduced in Table 2 below. Under this recently-issued guidance, plants possessing any one of the diagnostic characters listed in the table are to be considered "Bakersfield cactus." This approach has not yet been shown to accurately identify Bakersfield cactus; however, GANDA has used it to identify individuals of the listed variety for purposes of this report. GANDA recommends re-evaluating the identification of plants on the Project site as Bakersfield cactus using the standard criteria described in The Jepson Manual (Hickman, 1993), A California Flora (Munz and Keck 1973), and Flora of North America (FNA 1993).

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Table 2. Diagnostic characters that may help to differentiate *Opuntia basilaris* var. *treleasei* from var. *basilaris* [3] (reproduced from Cypher 2011).

Character	var. *basilaris*	var. *treleasei*	Inconclusive
Areole (eye-spot) position	depressed (sunken)	flush with surface or elevated	both depressed and flush on one plant
Number of areoles "across midstem segment" [4]	N/A[5]	<8 per diagonal row	8 or more per diagonal row or variable on one plant
Spines on pads	N/A	>6 mm long 2 or more in some areoles	no or few spines per pad, spines shorter than bristles (therefore not visible)
Ovary or fruit spines	none	3-10 rigid spines per upper areole or apical rim of spines	1-2 spines in upper areoles, weak spines, or both spiny and spineless fruits on one plant
Leaf length[6]	2 mm	5 mm	3-4 mm or absent
Pubescence on pads and fruits	pubescent (with downy hairs)	N/A	glabrous (hairless)
Chromosome number[7]	N/A	2n = 33	2n = 22

[3] Plants possessing even a single diagnostic characteristic of *Opuntia basilaris* var. *treleasei* should be considered to represent the endangered species for the purposes of project permitting and compliance with the California Endangered Species Act (CESA) and the California Environmental Quality Act (CEQA).

[4] Midstem segments are between the basal and terminal pads. Thus, this character is useful only for cactus plants that are three or more pads tall.

[5] Not applicable because the typical character state overlaps between var. *basilaris* and var. *treleasei*.

[6] Leaves are present for only a short time on young growth.

[7] A take permit is necessary to collect the root tips or flower buds needed for chromosome analysis.

During the botanical survey, every *Opuntia basilaris* plant occurring within the Project area was marked with a Trimble® GeoXT GPS unit. The character state for each of the diagnostic morphological characters provided in the CDFG guidance document (Cypher 2011) was recorded for each *Opuntia basilaris* plant directly into data dictionaries on the GPS units. All of the characteristics listed in the table were scored for each plant except for chromosome counts, which require a take permit, pubescence, which is difficult to score, and not diagnostic for the listed variety, and leaf length due to the ephemeral nature of the leaves. Following the surveys, the mapped cacti were assigned an identity based on the recommendations provided by CDFG (2011). Cacti displaying any one, or combination, of the diagnostic characters for var. *treleasei* were considered to be Bakersfield cactus. Cactus lacking any diagnostic characteristics of Bakersfield cactus were considered to be the common beavertail cactus.

2.2 California Desert Native Plants Act

All species afforded protection under the CDNPA were mapped concurrently with the botanical surveys. The CDNPA requires permits for the harvest or removal of certain endemic desert plant species in the Mojave and Sonoran deserts, and prohibits the take of certain species except for scientific or educational purposes. None of the species that are prohibited from take except for scientific or educational purposes are known to occur in the vicinity of the Project.

The CDNPA covers all members of the cactus family (*Cactaceae*), the agave family (*Agavaceae*), the torchwood family (*Burseraceae*), and the ocotillo family (*Fouquieriaceae*). The act also covers ironwood (*Olneya tesota*), mesquite (*Prosopis* spp.), palo verde (*Cercidium* spp.), fan palm (*Washingtonia filifera*), catclaw acacia (*Acacia greggii*), smoketree (*Psorothamnus spinosus*), desert holly (*Atriplex hymenelytra*), crucifixion thorn (*Castela emoryi*), and Panamint dudleya (*Dudleya saxosa*).

2.3 Joshua trees

GANDA was tasked with mapping "large" Joshua trees as defined by the Alta Oak Creek Mojave (AOCM) Joshua Tree Avoidance and Mitigation Plan (CH2M Hill 2010a). "Large" Joshua Trees are defined as trees that "are greater than nine feet tall, more than eight feet wide, and [with] more than seven branchings". During the floristic surveys, the location of each individual Joshua tree or group of trees that met the above criteria was marked with a Garmin or Trimble® GeoXT GPS unit. In some cases, groups of individual trees meeting the minimum size requirements were recorded as a single point and the number of trees per group was recorded.

2.4 Invasive plant species

An invasive plant species is a non-native plant that is included on the invasive plant lists of the California Department of Food and Agriculture (CDFA 2010) or the California Invasive Plant Council (Cal-IPC 2006). Several invasive plant species were widespread and abundant within the Project area and were therefore not mapped. Widespread and abundant invasive plant species observed on the site included cheatgrass (*Bromus tectorum*), red brome (*Bromus madritensis* ssp. *rubens*), Mediterranean grass (*Schismus* sp.) and redstem stork's bill (*Erodium cicutarium*). All other invasive weed species populations were mapped with GPS units. A single GPS point was recorded for each infestation area. Additional GPS points were recorded if the infestation had a visible break or if a significant change in density was observed.

3.0 Results

3.1 Special-status plants observed to occur on the project site

Three special-status plant species were observed within the Project site: the Federal and State Endangered Bakersfield cactus (Figure 2), pale-yellow layia (*Layia heterotricha*: CNPS List 1B.1), and Adobe yampah (*Perideridia pringlei*: CNPS List 4.3). Two adobe yampah plants in two separate locations were observed. Three sites, each with a single plant were recorded for pale-yellow layia, and several additional areas of suitable clay soils for this species were mapped (Figure 3). A total of 112 individual Bakersfield cactus plants were mapped within the Project survey area.

A discussion of each species is presented below. Maps depicting the location of each special-status species occurrence are presented in Figures 2 and 3, and the geographic coordinates of each occurrence are presented in Appendix B and C.

3.1.1 Bakersfield cactus

Bakersfield cactus is a perennial low-growing stem succulent in the Cactus family (Cactaceae) that typically spreads to form extensive thickets. The stems form fleshy, flattened green pads up to 18 cm long by 1 to 1.5 cm thick. The flowers are magenta and usually appear in May (ESRP 2006). Bakersfield cactus is State and Federally endangered and is included on CNPS List 1B.1.

The distribution of Bakersfield cactus has been described in a recent USFWS Recovery Plan (USFWS 1998) as restricted to a limited area of central Kern County near Bakersfield at elevations from approximately 460 to 1,800 feet. Previously, extensive colonies existed around Bakersfield, along the

bluffs of the Kern River, along the Caliente Creek drainage and nearby in the foothills of the western Tehachapi Mountains, and south to the Tejon Hills. Twisselmann (1967) describes a very large population in the Sand Ridge area near Arvin that eventually was protected by The Nature Conservancy within the Sand Ridge Preserve (USFWS 1998). The current distribution of Bakersfield cactus in the Bakersfield area is fragmented and much reduced (ESRP 2006). Specimen records from the Consortium of California Herbaria (2011) include three specimens from the Mojave Desert near the town of Mojave. These specimens are from the 1930s, and the occurrences in this report and others from the greater AOCM project area represent the most recent records of Bakersfield cactus in the Mojave Desert proper. Approximately one-third of the historical occurrences of Bakersfield cactus have been extirpated and the remaining populations are highly fragmented (USFWS 1998, ESRP 2006).

All of the *Opuntia basilaris* plants classified under the CDFG guidelines (2011) as Bakersfield cactus were observed to occur in the hills in the northern portion of the Project area (Figure 2). This is consistent with previous observations of these plants on the greater AOCM Project site, where the frequency of individuals with characteristics of Bakersfield cactus is greater on hilly sites at higher elevations.

3.1.2 Pale-yellow layia

Pale-yellow layia is an annual herb in the Sunflower family that occurs on alkaline or clay soils in Cismontane Woodland, Coastal Scrub, Pinyon and Juniper Woodland, and Valley and Foothill Grasslands (CNPS 2011). Known occurrences range in elevation from 984 to 5,592 feet. It has no State or Federal listing status, but is included on CNPS List 1B.1, indicating that it is rare, threatened or endangered in California and elsewhere, and seriously endangered in California.

In California, pale-yellow layia has been found in Fresno, Kings, Kern, Los Angeles, Monterey, Santa Barbara, San Benito, San Luis Obispo, and Ventura counties (CNPS 2011). The nearest previously known location to the Project area is in the Tomo-Kahni State Historic Park, seven miles north of the Project area (CCH 2011).

Three individual pale-yellow layia plants at three separate locations were observed. One of the individuals was located about 60 ft. outside of the survey boundary, while both of the other occurrences were within the Project boundary. The plants were found in non-native grasslands dominated by cheatgrass and red brome at two sites, and on barren soils at the third. At each location, the plants were associated with greenish-gray cracking clay soils. There are several clay lenses composed of these soils in a band adjacent to and below the prominent white alkaline rock outcrops that are visible on the areal imagery in the northern portion of the Project area (Figure 3). These outcrops are mapped as Torriorthents-rock outcrop complex, very steep by NRCS (2011), but the smaller clay inclusions associated with pale-yellow layia are not mapped, and the name of the clay soils series or horizon that serves as habitat for the species was not determined.

At each mapped site, only a single pale-yellow layia plant was observed, and the plants are likely to be more abundant during favorable years. It is possible that additional populations occur in areas with suitable soils, but were not detected due to the apparent low germination of the species in 2011. Germination for other annuals in the area also seems to have been poor in 2011. For example, thousands of dried desert candle (*Caulanthus coulteri*) remains from 2010 were observed on the same soils as pale-yellow layia, but only about a dozen live desert candle plants were observed in 2011. Areas of clay soils likely to be occupied by pale-yellow layia are depicted in Figure 3.

Pale-yellow layia has been assigned the State's highest rarity rank (list 1B.1), and the populations occurring on the Project site represent the easternmost known locations of the species, which has not been previously documented from the Mojave Desert. Impacts to these populations should be considered

significant under the California Environmental Quality Act. Avoidance of disturbance of these soils is recommended due to the possibility of larger populations of pale-yellow layia in the area during a more favorable rain year. Additional surveys are recommended.

3.1.3 Adobe yampah

Adobe yampah is a white-flowered perennial herb in the Carrot family (*Apiaceae*). It reaches 13 to 36 inches in height, and has oblong fleshy tuberous roots, dissected, slightly fleshy basal leaves, and flowers clustered in compound umbels (Hickman 1993). Adobe yampah flowers from April to June (CNPS 2011). It grows in Chaparral, Cismontane Woodland, Coastal Scrub, and Pinyon and Juniper Woodland communities at elevations ranging from 985 to 5,900 feet (CNPS 2011). Adobe yampah has no State or Federal listing status, but is included on CNPS List 4.3, a watch list (ibid.).

Adobe yampah is endemic to California, where it is known from Kern, Los Angeles, Monterey, Santa Barbara, San Luis Obispo, Tulare, and Ventura counties (CNPS 2011). There are many collections from Kern County (CCH 2011). Prior to surveys conducted for this project, the closest record was about ten miles southwest of the Project area at Tomo-Kahni State Historical Park, northeast of Monolith and Tehachapi (ibid.).

Adobe yampah was detected in 2 locations within the survey area during botanical surveys. Although both plants observed were in early flowering condition, it is likely that other plants occur in the area but were not yet flowering, as the normal flowering period for this species in the area is in June (E. Kentner pers. obs.). Because vegetative individuals are inconspicuous, additional surveys are planned to estimate the full extent of the populations in the Project area.

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OPBAT-2
OPBAT-1
OPBAT-17
OPBAT-15
OPBAT-14
OPBAT-13
OPBAT-63
OPBAT-62
OPBAT-61
OPBAT-56
OPBAT-53
OPBAT-55
OPBAT-54
OPBAT-59
OPBAT-58
OPBAT-57
OPBAT-52
OPBAT-42
OPBAT-37
OPBAT-6
OPBAT-36
OPBAT-34
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OPBAT-3
OPBAT-47
OPBAT-44
OPBAT-45
OPBAT-43
OPBAT-39
OPBAT-41
OPBAT-40
OPBAT-31
OPBAT-26
OPBAT-24
OPBAT-27
OPBAT-21
OPBAT-25
OPBAT-22
OPBAT-18

GANDA

Legend

Alta East Wind Project Survey Area

Bakersfield cactus

Opuntia basilaris var. treleasei



0 200 Meters

0 1,000 Feet

1 inch = 500 feet

Figure 2. Bakersfield cactus location map.
Alta East Wind Project

Kern County

June 2011

Map 1 of 5



OPBAT-50
OPBAT-46
OPBAT-38
OPBAT-33
OPBAT-32
OPBAT-35
OPBAT-23
OPBAT-16
OPBAT-30
OPBAT-8
OPBAT-12
OPBAT-11
OPBAT-10
OPBAT-9
OPBAT-29
OPBAT-28
OPBAT-2

GANDA

Legend

Alta East Wind Project Survey Area

Bakersfield cactus
Opuntia basilaris var. *treleasei*

Project Location

0 200 Meters

0 1,000 Feet

1 inch = 500 feet

Figure 2. Bakersfield cactus location map
Alta East Wind Project

Kern County

June 2011



Legend

Alta East Wind Project Survey Area

Bakersfield cactus

Opuntia basilaris var. *treleasei*

Project Location

0 200 Meters

0 1,000 Feet

1 inch = 500 feet

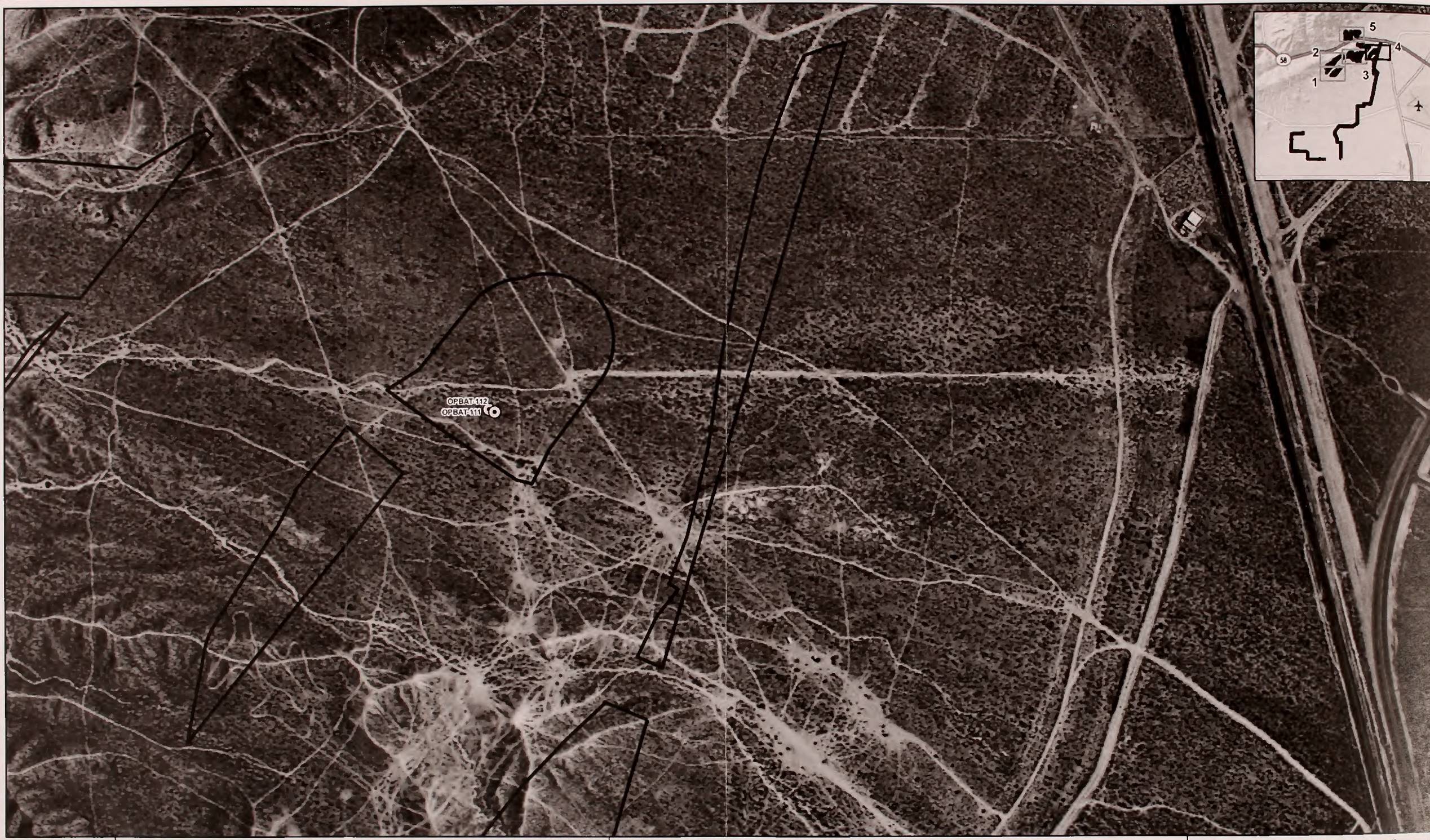
GANDA

Figure 2. Bakersfield cactus location map.
Alta East Wind Project

Kern County

June 2011

Map 3 of 5



GANDA

Legend

Alta East Wind Project Survey Area

Bakersfield cactus

Opuntia basilaris var. *treleasei*

Project Location

0 200 Meters

0 1,000 Feet

1 inch = 500 feet

Figure 2. Bakersfield cactus location map.
Alta East Wind Project

Kern County

June 2011



GANDA

Legend

Alta East Wind Project Survey Area

Bakersfield cactus
Opuntia basilaris var. treleasei

Project Location

0 200 Meters

0 1,000 Feet

1 inch = 500 feet

Figure 2. Bakersfield cactus location map
Alta East Wind Project

Kern County

June 2011

Map 5 of 5



GANDA

Legend

Alta East Wind Project Survey Area

Pale-yellow Layia Suitable Habitat

Special Status Plants

▲ Layia Heterotricha - Pale-yellow Layia

□ Perideridia Pringlei - Adobe Yampah



0 200 Meters

0 1,000 Feet

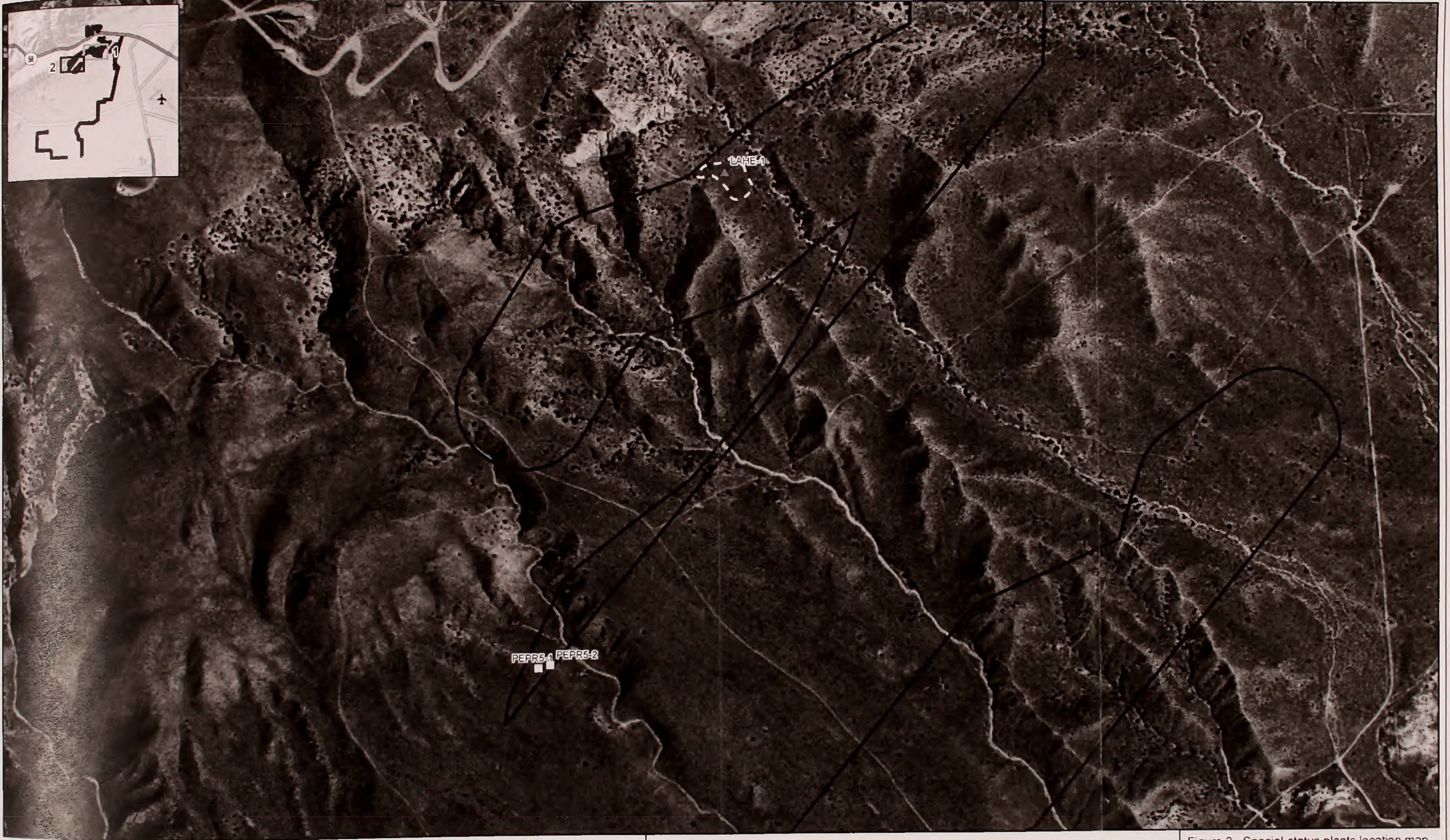
1 inch = 500 feet

Figure 3. Special-status plants location map
Alta East Wind Project

Kern County

June 2011

Map 1 of 2



GANDA

Legend

Alta East Wind Project Survey Area

Pale-yellow Layia Suitable Habitat

Special Status Plants

▲ Layia Heterotricha - Pale-yellow Layia

Perideridia Pringlei - Adobe Yampah

Project Location

Meters
0 200

Feet
0 1,000

1 inch = 500 feet

Figure 3. Special-status plants location map.
Alta East Wind Project

Kern County

June 2011

Map 2 of 2

3.2 Special-status plants not observed, but with the potential to occur on the project site

Of the 45 species determined to have the potential to occur in the vicinity of the project area as a result of the literature and database searches, 30 species have been determined to be absent from the project area based on the survey results. Three species were observed, 11 species are unlikely to occur or may have been undetectable at the time of the surveys due to their later flowering periods (Table 1), and one species, Tracy's eriastrum is considered possible pending further late-season surveys. Additional surveys of the project area for late blooming taxa are scheduled for June of 2011.

Species accounts and assessments of habitat suitability within the Project survey area for each of the special-status species not observed, but with the potential to occur in the Project vicinity are presented in Appendix E.

3.3 California Desert Native Plants Act

Four species afforded protection under the CDNPA, in addition to Joshua trees (Section 3.4 below) were observed within the survey area (Figure 4). A total of 673 silver cholla (*Opuntia echinocarpa*), 1,433 chaparral yucca (*Yucca whipplei*), 728 beavertail cactus, and 112 Bakersfield cactus were inventoried and mapped (Figure 3).

3.4 Joshua trees

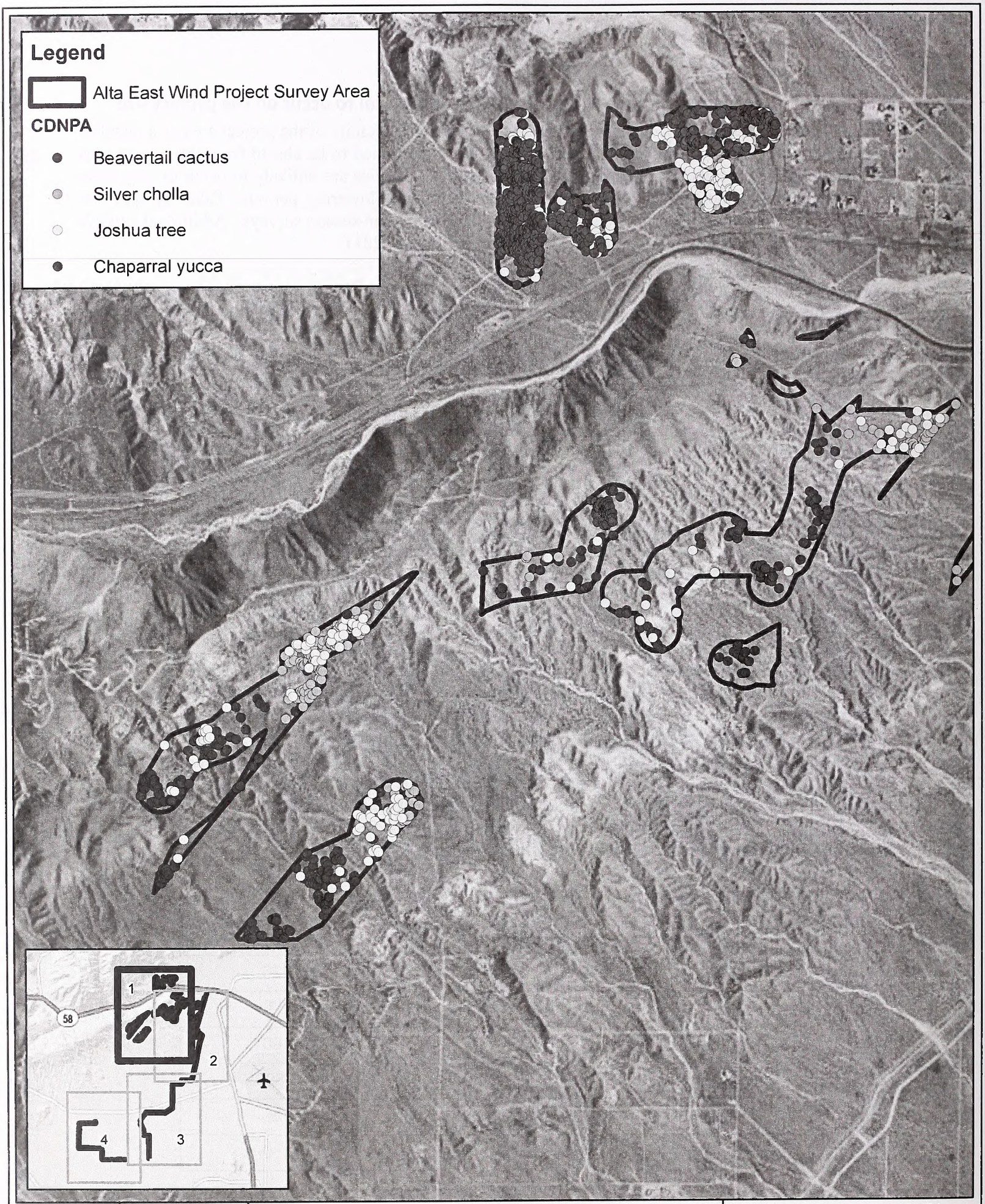
A total of 1,135 Joshua trees meeting the "large" size criteria established in the AOCM Joshua Tree Avoidance and Mitigation (CH2M Hill 2010a) Plan were inventoried and mapped (Figure 4).

3.5 Invasive plant species

Portions of the Project area have been grazed by sheep for an unknown period of time, a disturbance regime that seems to have favored the establishment and spread of many species of invasive plant species. Widespread and abundant plant species observed to occur at various densities throughout the Project area include cheatgrass, red brome, Mediterranean grass and redstem stork's bill. Populations of these species were not tallied or mapped for this report. Mapped species of invasive plant species occurring on the Project site include ripgut brome (*Bromus diandrus*), flixweed (*Descurainia sophia*), shortpod mustard (*Hirschfeldia incana*), wall barley (*Hordeum murinum*), tumble mustard (*Sisymbrium altissimum*), and oriental hedge mustard (*Sisymbrium orientale*). Table 4 presents the number of locations and estimated total number of individuals observed for each invasive weed species mapped in the Project area. The locations of invasive weed infestations are depicted in Figure 5.

Table 3. Invasive plant species observed on the Alta East Wind Energy Project site.

Invasive Weed Species	Sites mapped	Est. No. observed
Ripgut brome	3	320
Flixweed	4	53
Shortpod mustard	6	160
Wall barley	14	3,801
Tumble mustard	4	96
Oriental hedge mustard	9	130



GANDA

Project Location

Source: ESRI, World Street Map, GANDA GIS 2011

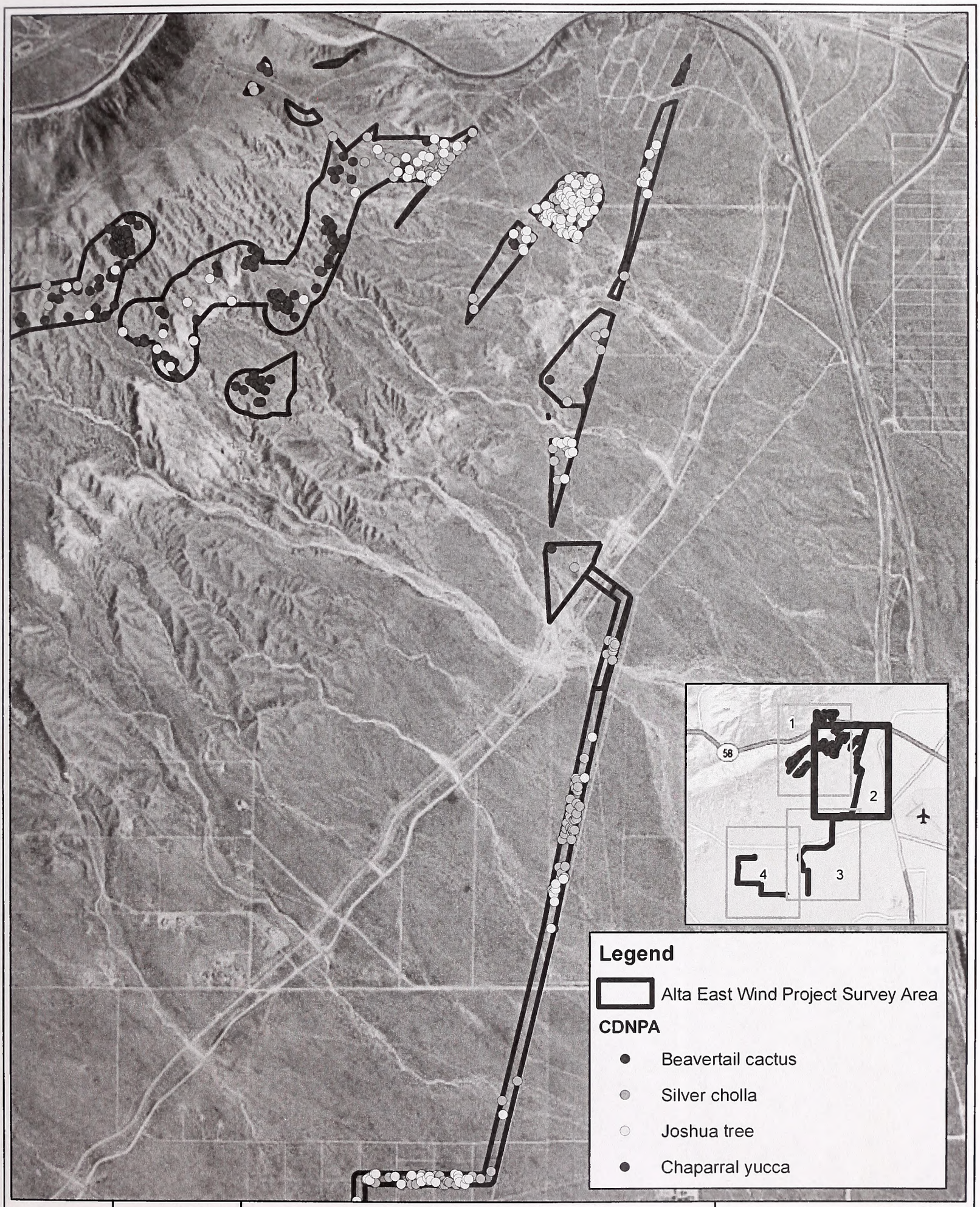
0 1 Kilometers

0 1 Miles

Figure 4. Joshua tree and CDNPA species location map.
Alta East Wind Project

Kern County

June 2011



GANDA

Project Location:

Source: ESRI, World Street Map; GANDA GIS 2011

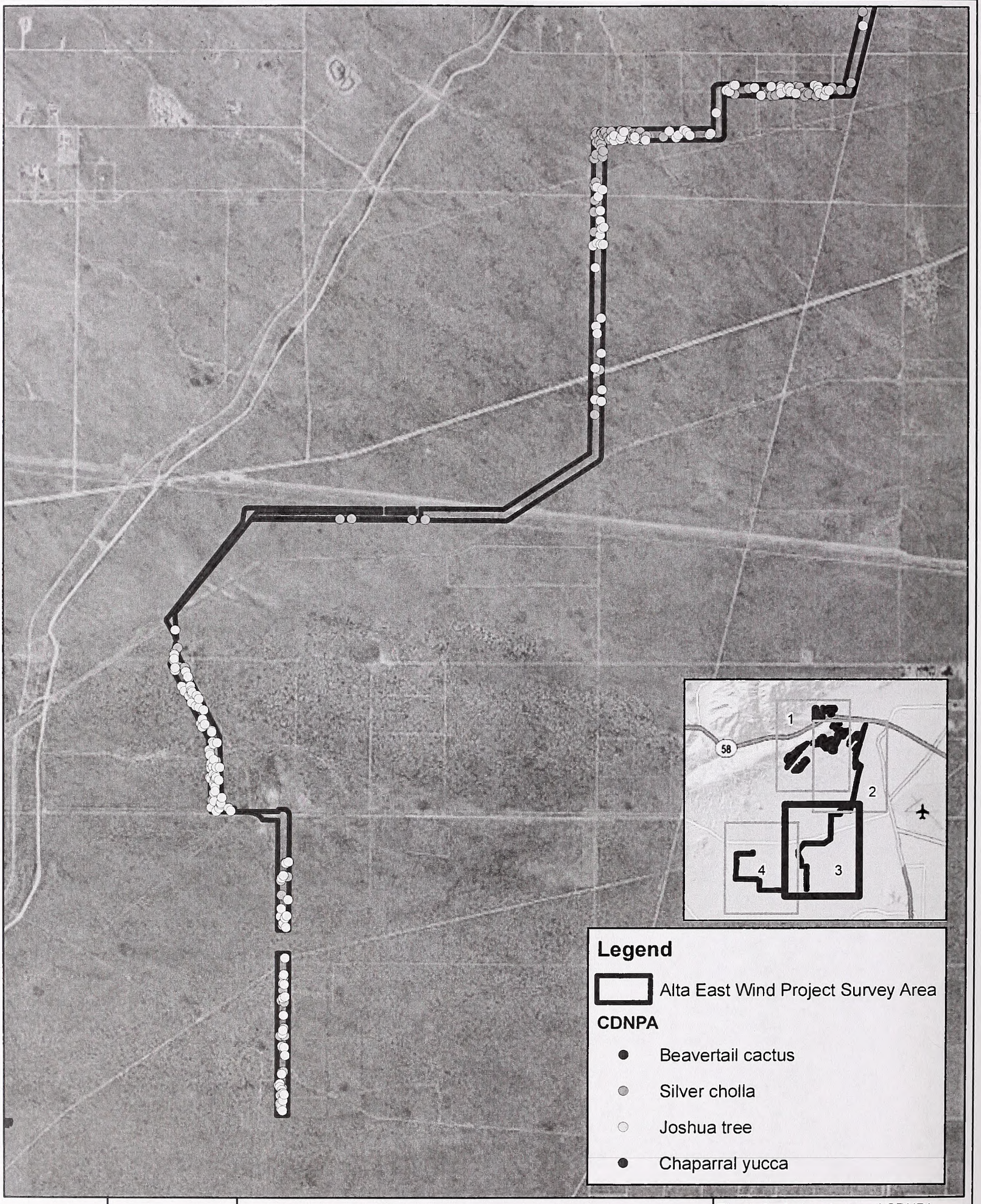
0 1 Kilometers

0 1 Miles

Figure 4. Joshua tree and CDNPA species location map.
Alta East Wind Project

Kern County

June 2011



GANDA

Project Location:

Source: ESRI, World Street Map; GANDA GIS 2011

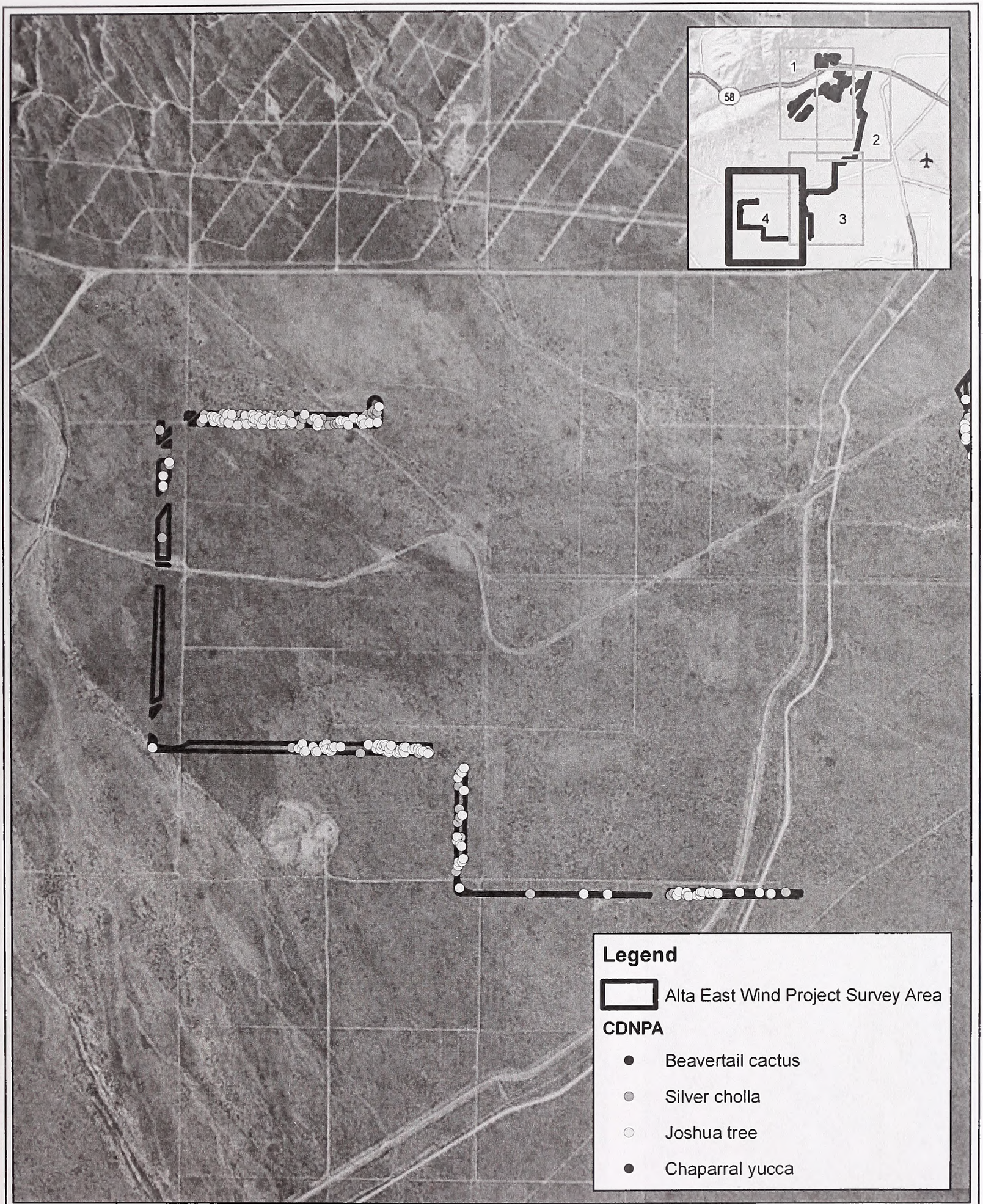
0 1 Kilometers

0 1 Miles

Figure 4. Joshua tree and CDNPA species location map.
Alta East Wind Project

Kern County

June 2011



GANDA

Project Location:

Source: ESRI, World Street Map; GANDA GIS 2011

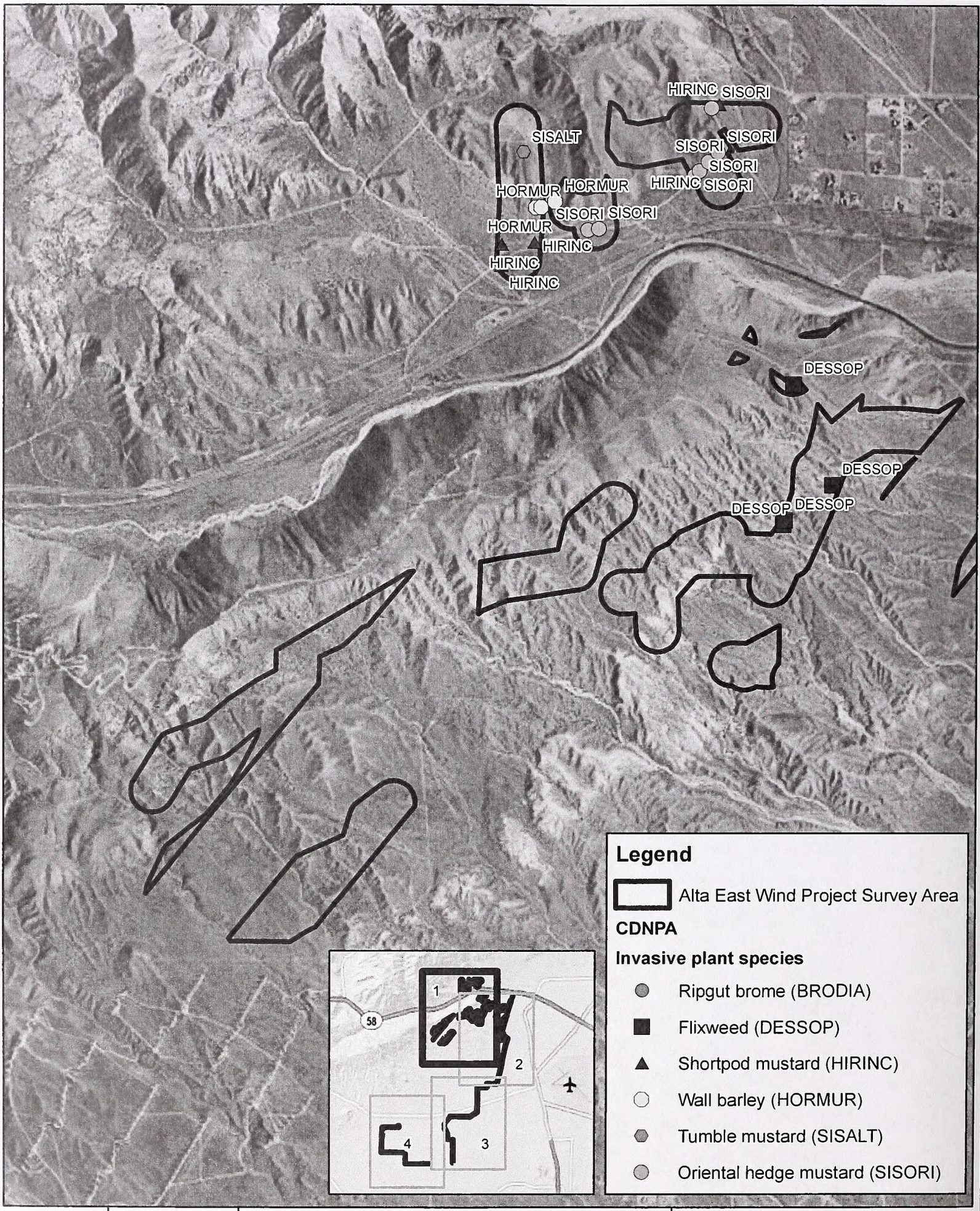
0 1 Kilometers

0 1 Miles

Figure 4. Joshua tree and CDNPA species location map.
Alta East Wind Project

Kern County

June 2011



GANDA

Project Location:

Source: ESRI, World Street Map; GANDA GIS 2011

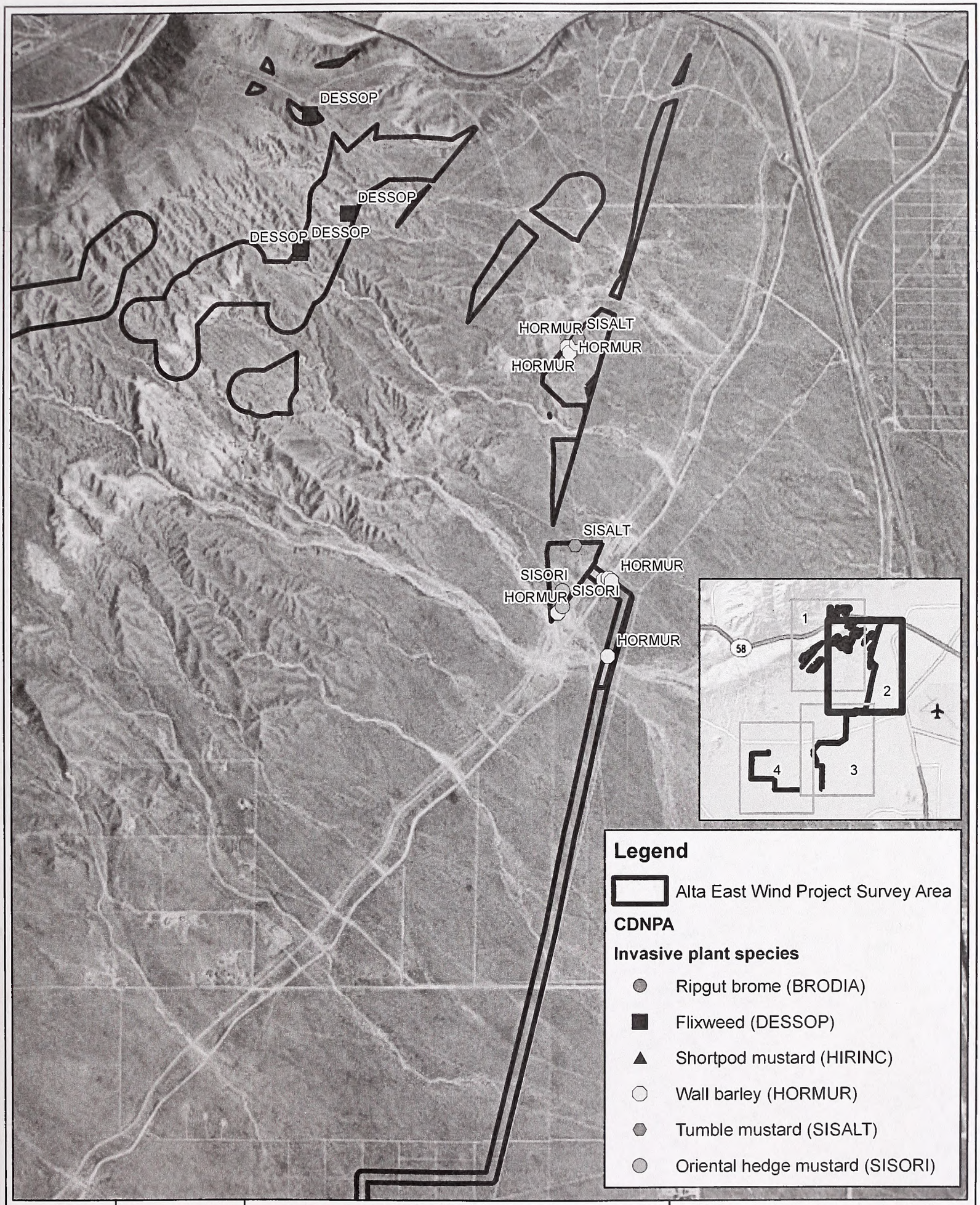
Kilometers
0 1

Miles
0 1

Figure 5. Invasive plant species location map.
Alta East Wind Project

Kern County

June 2011



GANDA

Project Location:

Source: ESRI, World Street Map; GANDA GIS 2011

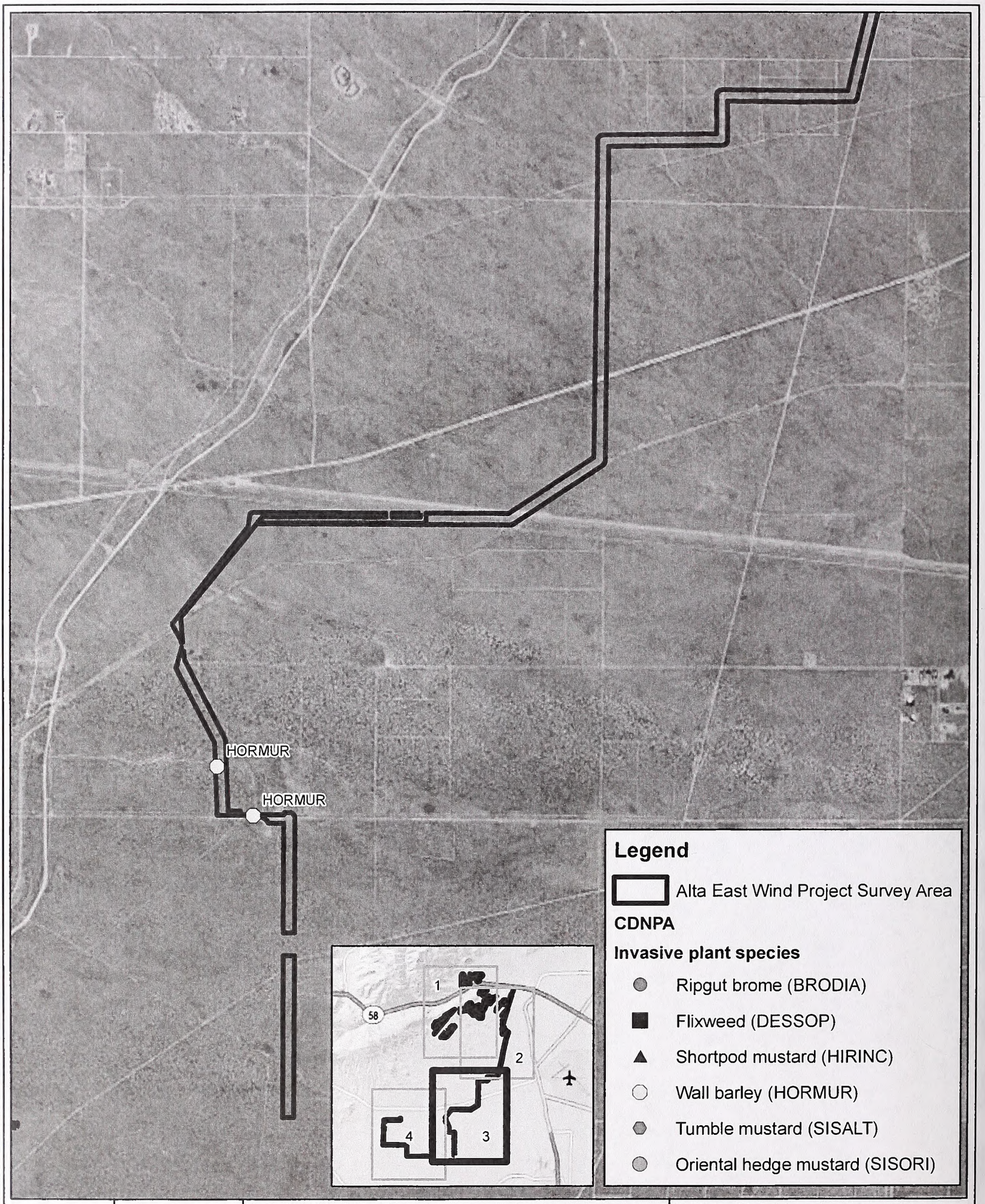
0 1 Kilometers

0 1 Miles

Figure 5. Invasive plant species location map.
Alta East Wind Project

Kern County

June 2011



GANDA

Project Location:

Source: ESRI, World Street Map; GANDA GIS 2011

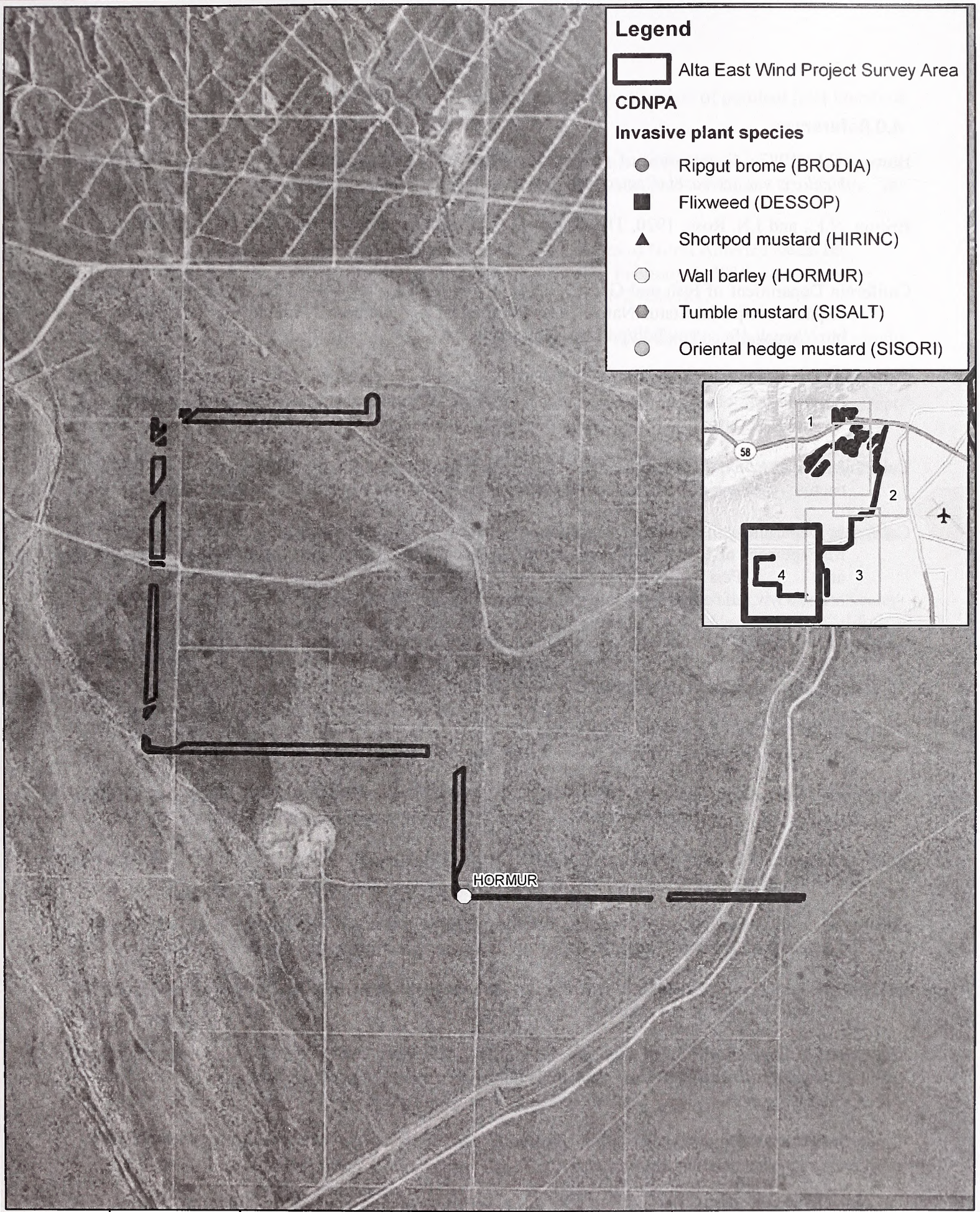
Kilometers
0 1

Miles
0 1

Figure 5. Invasive plant species location map.
Alta East Wind Project

Kern County

June 2011



GANDA

Project Location:

Source: ESRI, World Street Map; GANDA GIS 2011

0 1 Kilometers

0 1 Miles

Figure 5. Invasive plant species location map.
Alta East Wind Project

Kern County

June 2011

4.0 References

Bowen, C.L. 1987. Segregation of *Opuntia treleasei* and *Opuntia treleasei* var. *kernii* from *Opuntia basilaris* var. *treleasei* (Cactaceae). Unpublished draft manuscript, 9 pp.

Britton, N.L., and J.N. Rose. 1920. The Cactaceae. Carnegie Institute, Washington, DC, Publication 248, 1:1-236.

California Department of Fish and Game (CDFG). Nov. 2009a. Protocol for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities. Sacramento, CA. http://www.dfg.ca.gov/bdb/pdfs/guideplt.pdf.

California Department of Fish and Game (CDFG). 2009b. Vegetation Classification and Mapping Program List of California Vegetation Alliances. Biogeographic Data Branch. Sacramento, CA. Available at: http://www.dfg.ca.gov/biogeodata/vegcamp/

California Department of Fish and Game (CDFG). 2011. Taxonomy and identification of Bakersfield cactus: A review of pertitent [sic] literature with recommendations. Unpublished report.

California Department of Food and Agriculture (CDFA). 2010. Notes on Identification, Biology, and Management of Plants Defined as Noxious Weed by California Law. Division of Plant Health and Pest Preventions Services. Available at: http://www.cdfa.ca.gov/phpps/ipc/encycloweedia/encycloweedia_hp.htm

California Invasive Plant Council (Cal-IPC). 2006. California Invasive Plant Inventory. Cal-IPC Publication 2006-02. California Invasive Plant Council: Berkeley, CA. Available at: http://www.cal-ipc.org/ip/inventory/weedlist.php

California Native Plant Society (CNPS). 2001. Botanical survey guidelines of the California Native Plant Society. 9 December 1983 / Revised 2 June 2001.

California Native Plant Society (CNPS). 2011. Inventory of rare and endangered plants of California (online edition, version). Accessed at: http://cnps.site.aplus.net/cgi-bin/inv/inventory.cgi

California Natural Diversity Database (CNDDB). 2011a. RareFind3. Electronic database. Sacramento, California.

California Natural Diversity Database (CNDDB). 2011b. Special Vascular Plants, Bryophytes, and Lichens List. Quarterly publication. 71 pp.

CH2M Hill Engineers (CH2M HILL). 2010a. Joshua tree avoidance and mitigation plan, Alta-Oak Creek Mojave Wind Project. February.

CH2M HILL Engineers (CH2M HILL). 2010b. Biological Resources Report for the Alta East Wind Energy Project in Kern County, California. Prepared for Alta Windpower Development, LLC. August.

Consortium of California Herbaria (CCH). Accessed March 2011. Accession results for various species. http://ucjeps.berkeley.edu/consortium/.

Coulter, J.M. 1896. Preliminary revision of the North American species of Echinocactus, Cereus, and Opuntia. Contributions of the U.S. National Herbarium

Cypher, E. 2011. Taxonomy and identification of Bakersfield cactus: A review of pertitent [sic] literature with recommendations. Unpublished report.

Endangered Species Recovery Program (ESRP), California State University, Stanislaus. 2006. Species account for *Opuntia basilaris* var. *treleasei*. Accessed March 5, 2010, at: http://esrp.csustan.edu/speciesprofiles/profile.php?sp=opba

Flora of North America Editorial Committee, eds (FNA). 1993. Flora of North America North of Mexico. 15+ vols. New York and Oxford. Vol. 4. Accessed February 7, 2010 at: http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=242413847

Gowen. 2008. New taxa following a reassessment of *Eriastrum sparsiflorum* (Polemoniaceae). Madroño Vol. 55: 82-87.

Griffiths, D., and R.F. Hare. 1906. Prickly pear and other cacti as food for stock. II. New Mexico Dept. Agric. Bull. 60:81-82

Hickman, J., ed. 1993. The Jepson manual: Higher plants of California. University of California Press, Berkeley, CA.

Holland, R. F. 1986. Preliminary descriptions of the terrestrial natural communities of California. California Department of Fish and Game. Unpublished report.

Keeler-Wolf, Todd. 2007. Chapter 22. Mojave desert scrub vegetation. In: Barbour, M.G., T. Keeler-Wolf, and A.A. Schoenherr. 2007. *Terrestrial vegetation of California.* University of California Press, Berkeley.

Mason, H. L. 1945. The genus *Eriastrum* and the influence of Bentham and Gray upon the problem of generic confusion in Polemoniaceae. Madroño 8:65-91.

Munz, P, and D.D. Keck. 1973. *A California Flora and Supplement*. Univ. of California Press, Berkeley.

National Weather Service (NWS). 2011. Climate data for Mojave California. Accessed at: http://www.wrh.noaa.gov/hnx/coop/mojave.htm

Natural Resources Conservation Service (NRCS). 2011. Soil Data Mart. Online Soils data for Kern County. Accessed at: http://soildatamart.nrcs.usda.gov/

Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. A manual of California vegetation, 2nd ed. California Native Plant Society, Sacramento, CA.

Twisselmann, E. C. 1967. A flora of Kern County, California. *The Waksman Journal of Biology* 25(1-2):1-395.

U.S. Fish and Wildlife Service (USFWS). 1996a. Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants. USFWS, September 23, 1996. Available at: http://www.fws.gov/sacramento/es/documents/listed_plant_survey_guidelines.htm

U.S. Fish and Wildlife Service (USFWS). 1996b. Endangered and Threatened Wildlife and Plants; Review of Plant and Animal Taxa that are Candidates for Listing as Endangered or Threatened Species; Notice of Review; Proposed Rule. Federal Register 61(40): 7596-7613.

U.S. Fish and Wildlife Service (USFWS). 1998. Recovery Plan for Upland Species of the San Joaquin Valley, California. Region 1, Portland, Oregon. Accessed March 10, 2010, at: http://ecos.fws.gov/docs/recovery_plans/1998/980930a.pdf

U.S. Fish and Wildlife Service (USFWS). 2006. List of federal candidates for listing, available at: http://ecos.fws.gov/endangered/candidates/index.html

U.S. Fish and Wildlife Service (USFWS). 2011. List of federally listed threatened & endangered species which may occur in Kern, Los Angeles, and San Bernardino counties, CA. USFWS, Ventura Fish and Wildlife Office, Ventura, CA, available at: http://www.fws.gov/ventura/speciesinfo/

Weather Underground. 2011. Precipitation data for Mojave California. Accessed at: http://www.wunderground.com.

Appendix A

Vascular Plant Species Observed

Scientific Name	Common Name
Gymnosperms	
Cupressaceae	**Cypress family**
Juniperus californica	California juniper
Ephedraceae	**Mormon-tea family**
Ephedra nevadensis	Nevada jointfir
Ephedra viridis	Mormon tea
Dicots	
Apiaceae	**Carrot family**
Lomatium macrocarpum	bigseed biscuitroot
Lomatium mohavense	Mojave desertparsley
Asteraceae	**Aster family**
Acamptopappus sphaerocephalus	rayless goldenhead
Agoseris retrorsa	spearleaf agoseris
Ambrosia dumosa	white bursage
Anisocoma acaulis	scalebud
Calycoseris parryi	yellow tackstem
Chaenactis fremontii	pincushion flower
Chrysothamnus nauseosus	rubber rabbitbrush
Chrysothamnus teretifolius	green Rabbitbrush
Cirsium occidentale var. occidentale	cobwebby thistle
Coreopsis bigelovii	Bigelow's tickseed
Coreopsis calliopsidea	leafstem tickseed
Encelia actonii	Acton's brittlebush
Ericameria cooperi	Cooper's goldenbush
Ericameria linearifolia	narrowleaf goldenbush
Eriophyllum pringlei	Pringle's woolly sunflower
Eriophyllum wallacei	Wallace Eriophyllum
Filago depressa	dwarf cottonrose
Gutierrezia sarothrae	broom snakeweed
Hymenoclea salsola	burrobrush
Lactuca serriola	prickly lettuce
Lasthenia californica	California goldfields
Layia glandulosa	whitedaisy tidytips
Layia heterotricha	paleyellow tidytips
Lepidospartum squamatum	California scale broom
Lessingia filaginifolia	California aster

Scientific Name	Common Name
Lessingia lemmonii	Lemmon's lessingia
Malacothrix coulteri	snake's head
Malacothrix glabrata	smooth desertdandelion
Stephanomeria exigua	small wirelettuce
Stephanomeria pauciflora	brownplume wirelettuce
Syntrichopappus fremontii	yellowray Fremont's-gold
Tetradymia stenolepis	Mojave cottonthorn
Uropappus lindleyi	Lindley's silverpuffs
Xylorhiza tortifolia	Mojave woodyaster
Boraginaceae	**Borage family**
Amsinckia tessellata	bristly fiddleneck
Cryptantha circumscissa	cushion cryptantha
Cryptantha decipiens	gravelbar cryptantha
Cryptantha mohavensis	Mojave cryptantha
Cryptantha nevadensis	Nevada cryptantha
Cryptantha pterocarya	wingnut cryptantha
Cryptantha utahensis	scented cryptantha
Heliotropium curassavicum	salt heliotrope
Pectocarya linearis	sagebrush combseed
Pectocarya penicillata	sleeping combseed
Pectocarya platycarpa	broadfruit combseed
Pectocarya setosa	moth combseed
Plagiobothrys arizonicus	Arizona popcornflower
Brassicaceae	**Mustard family**
Arabis pulchra	beautiful rockcress
Brassica nigra	black mustard
Caulanthus coulteri	Coulter's wild cabbage
Caulanthus inflatus	desert candle
Descurainia pinnata	western tansymustard
Descurainia sophia	herb sophia
Guillenia lasiophylla	California mustard
Lepidium fremontii	desert pepperweed
Sisymbrium altissimum	tall tumblemustard
Sisymbrium orientale	Indian hedgemustard
Stanleya pinnata	desert prince's plume
Tropidocarpum gracile	dobie pod
Cactaceae	**Cactus family**
Opuntia basilaris var. *basilaris*	beavertail pricklypear
Opuntia echinocarpa	silver cholla
Campanulaceae	**Bellflower family**
Nemacladus orientalis	eastern threadplant

Scientific Name	Common Name
Chenopodiaceae	**Goosefoot family**
Atriplex canescens	fourwing saltbush
Atriplex polycarpa	cattle saltbush
Grayia spinosa	spiny hopsage
Krascheninnikovia lanata	winterfat
Monolepis nuttalliana	Nuttall's povertyweed
Cucurbitaceae	**Cucumber family**
Marah fabaceus	California manroot
Cuscutaceae	**Dodder family**
Cuscuta californica	chaparral dodder
Euphorbiaceae	**Spurge family**
Chamaesyce albomarginata	whitemargin sandmat
Fabaceae	**Pea family**
Astragalus didymocarpus var.	dwarf white milkvetch
Astragalus lentiginosus var. *variabilis*	freckled milkvetch
Astragalus pachypus var. *pachypus*	thickpod milkvetch
Lotus humistratus	foothill deervetch
Lupinus bicolor	miniature lupine
Lupinus concinnus	bajada lupine
Lupinus excubitus	grape soda lupine
Lupinus microcarpus	chick lupine
Trifolium gracilentum	pinpoint clover
Geraniaceae	**Geranium family**
Erodium cicutarium ssp. *cicutarium*	redstem stork's bill
Hydrophyllaceae	**Waterleaf family**
Emmenanthe penduliflora var. *penduliflora*	whisperingbells
Nama demissum	purplemat
Phacelia distans	distant phacelia
Phacelia fremontii	Fremont's phacelia
Phacelia glandulifera	sticky phacelia
Phacelia heterophylla	varileaf phacelia
Phacelia tanacetifolia	lacy phacelia
Lamiaceae	**Mint family**
Salazaria mexicana	Mexican bladdersage
Salvia columbariae	chia
Salvia dorrii	purple sage

Scientific Name	Common Name
Loasaceae	**Loasa family**
Mentzelia albicaulis	whitestem blazingstar
Mentzelia veatchiana	Veatch's blazingstar
Malvaceae	**Mallow family**
Eremalche exilis	white mallow
Sphaeralcea ambigua	desert globemallow
Nyctaginaceae	**Four o'clock family**
Mirabilis bigelovii	wishbone-bush
Onagraceae	**Evening Primrose family**
Camissonia boothii	Booth's evening primrose
Camissonia campestris	Mojave suncup
Camissonia claviformis	browneyes
Camissonia pallida ssp. *pallida*	paleyellow suncup
Camissonia palmeri	Palmer evening primrose
Papaveraceae	**Poppy family**
Eschscholzia minutiflora ssp. *minutiflora*	pygmy golden poppy
Platystemon californicus	creamcups
Polemoniaceae	**Phlox family**
Eriastrum	woollystar
Eriastrum densifolium	giant woollystar
Eriastrum diffusum	miniature woollystar
Gilia brecciarum	Nevada gilia
Gilia capitata	bluehead gilia
Gilia latiflora	hollyleaf gilia
Gilia latifolia	broadleaf gilia
Gilia modocensis	Modoc gilia
Linanthus aureus	golden deserttrumpets
Linanthus parryae	sandblossoms
Loeseliastrum matthewsii	desert calico
Loeseliastrum schottii	Schott's calico
Polygonaceae	**Buckwheat family**
Centrostegia thurberi	red triangles
Chorizanthe brevicornu	brittle spineflower
Chorizanthe watsonii	fivetooth spineflower
Eriogonum angulosum	anglestem buckwheat
Eriogonum deflexum	flatcrown buckwheat
Eriogonum fasciculatum var. *polifolium*	Eastern Mojave buckwheat

Scientific Name	Common Name
Eriogonum gracillimum	rose and white buckwheat
Eriogonum heermannii var. *heermannii*	Heermann's buckwheat
Eriogonum nudum var. *westonii*	Weston's buckwheat
Eriogonum plumatella	yucca buckwheat
Eriogonum pusillum	yellowturbans
Eriogonum trichopes	little deserttrumpet
Eriogonum viridescens	twotooth buckwheat
Mucronea perfoliata	perfoliate spineflower
Portulacaceae	**Purslane family**
Calyptridium monandrum	pussy paws
Claytonia perfoliata	miner's lettuce
Ranunculaceae	**Buttercup family**
Delphinium parishii	desert larkspur
Rosaceae	**Rose family**
Purshia tridentata var. *glandulosa*	antelope brush
Scrophulariaceae	**Figwort family**
Castilleja applegatei ssp. *martinii*	wavyleaf Indian paintbrush
Castilleja chromosa	desert Indian paintbrush
Mimulus bigelovii	Bigelow's monkeyflower
Penstemon incertus	Mojave beardtongue
Solanaceae	**Potato family**
Lycium andersonii	Anderson's box thorn
Lycium cooperi	peach thorn
Zygophyllaceae	**Creosote-bush family**
Larrea tridentata	creosote bush
Monocots	
Agavaceae	**Century-plant family**
Yucca brevifolia	Joshua tree
Yucca whipplei	chaparral yucca
Liliaceae	**Lily family**
Allium fimbriatum var. *fimbriatum*	fringed onion
Calochortus kennedyi var. *kennedyi*	desert mariposa lily
Dichelostemma capitatum	bluedicks
Poaceae	**Grass family**
Achnatherum hymenoides	Indian ricegrass
Achnatherum lemmonii	Lemmon's needlegrass
Achnatherum speciosum	desert needlegrass
Bromus carinatus	California brome
Bromus diandrus	ripgut brome

Scientific Name	Common Name
Bromus madritensis ssp. *rubens*	red brome
Bromus tectorum	cheatgrass
Elymus elymoides	squirreltail
Hordeum murinum ssp. *leporinum*	hare barley
Poa secunda	Sandberg bluegrass
Schismus	Mediterranean grass
Vulpia microstachys	small fescue

Appendix B

Bakersfield cactus locations

(UTM NAD 83 Zone 11S)

Map label	Easting	Northing
OPBAT-1	385465.690	3883834.270
OPBAT-2	385542.720	3883913.360
OPBAT-3	385572.260	3883358.170
OPBAT-4	385574.190	3883359.500
OPBAT-5	385579.350	3883360.230
OPBAT-6	385593.770	3883416.360
OPBAT-7	385606.790	3883374.630
OPBAT-8	385746.130	3884094.310
OPBAT-9	385875.440	3883978.100
OPBAT-10	385935.690	3884005.300
OPBAT-11	385937.960	3884104.940
OPBAT-12	385938.360	3884090.580
OPBAT-13	385951.760	3883795.840
OPBAT-14	385952.530	3883797.270
OPBAT-15	385960.340	3883805.330
OPBAT-16	385974.370	3884265.080
OPBAT-17	385993.270	3883841.040
OPBAT-18	386017.820	3883017.510
OPBAT-19	386018.780	3883033.320
OPBAT-20	386024.000	3883027.490
OPBAT-21	386027.880	3883033.250
OPBAT-22	386028.320	3883022.520
OPBAT-23	386029.070	3884325.200
OPBAT-24	386041.850	3883078.130
OPBAT-25	386042.410	3883016.450
OPBAT-26	386045.710	3883071.680
OPBAT-27	386046.870	3883046.040
OPBAT-28	386086.620	3883992.420
OPBAT-29	386089.170	3883988.900
OPBAT-30	386115.980	3884229.310
OPBAT-31	386146.880	3883149.430
OPBAT-32	386313.900	3884355.820
OPBAT-33	386341.450	3884377.960
OPBAT-34	386356.920	3883393.090
OPBAT-35	386365.550	3884306.810
OPBAT-36	386378.310	3883407.710
OPBAT-37	386398.390	3883455.430
OPBAT-38	386440.760	3884516.320
OPBAT-39	386464.370	3883217.920
OPBAT-40	386465.570	3883216.540
OPBAT-41	386466.730	3883196.790
OPBAT-42	386473.760	3883520.130
OPBAT-43	386486.180	3883222.070
OPBAT-44	386529.630	3883291.700
OPBAT-45	386557.790	3883270.360
OPBAT-46	386608.380	3884633.370

Map label	Easting	Northing
OPBAT-47	386611.970	3883326.960
OPBAT-48	386670.480	3883728.550
OPBAT-49	386673.120	3883729.480
OPBAT-50	386674.620	3884697.140
OPBAT-51	386703.230	3883714.120
OPBAT-52	386712.240	3883564.470
OPBAT-53	386720.290	3883724.630
OPBAT-54	386723.750	3883711.720
OPBAT-55	386725.090	3883706.740
OPBAT-56	386729.710	3883741.170
OPBAT-57	386740.510	3883545.720
OPBAT-58	386777.180	3883565.020
OPBAT-59	386839.010	3883675.480
OPBAT-60	386854.450	3883824.130
OPBAT-61	386866.270	3883801.930
OPBAT-62	386898.210	3883815.150
OPBAT-63	386917.860	3883827.090
OPBAT-64	387398.480	3886801.090
OPBAT-65	387574.650	3886722.350
OPBAT-66	387596.670	3887093.300
OPBAT-67	387618.260	3887150.600
OPBAT-68	387632.680	3884906.040
OPBAT-69	387687.420	3885057.250
OPBAT-70	387788.930	3887004.340
OPBAT-71	387812.910	3886911.260
OPBAT-72	387813.060	3886890.230
OPBAT-73	387818.170	3886947.210
OPBAT-74	387834.640	3886810.460
OPBAT-75	387835.820	3886844.640
OPBAT-76	387838.740	3886743.840
OPBAT-77	387872.760	3884940.800
OPBAT-78	387890.510	3886889.900
OPBAT-79	387902.510	3886768.510
OPBAT-80	387926.160	3885059.490
OPBAT-81	387963.320	3884877.990
OPBAT-82	388011.950	3886795.770
OPBAT-83	388020.000	3886810.540
OPBAT-84	388130.940	3884709.600
OPBAT-85	388146.030	3884695.580
OPBAT-86	388150.020	3884696.660
OPBAT-87	388165.530	3884789.510
OPBAT-88	388187.500	3884669.340
OPBAT-89	388194.460	3884886.780
OPBAT-90	388220.620	3884763.950
OPBAT-91	388236.050	3884786.410
OPBAT-92	388271.530	3884565.970

Map label	Easting	Northing
OPBAT-93	388485.980	3887002.920
OPBAT-94	388526.910	3887003.500
OPBAT-95	388546.160	3887001.810
OPBAT-96	388557.310	3887205.490
OPBAT-97	388562.080	3887002.400
OPBAT-98	388563.470	3886918.660
OPBAT-99	388588.950	3887183.030
OPBAT-100	388596.530	3887010.930
OPBAT-101	388609.480	3887378.180
OPBAT-102	388667.120	3887036.410
OPBAT-103	388712.260	3884467.450
OPBAT-104	388735.530	3884524.570
OPBAT-105	388822.330	3884659.540
OPBAT-106	388843.290	3884811.780
OPBAT-107	388890.260	3884879.540
OPBAT-108	388908.670	3884918.700
OPBAT-109	389008.720	3885200.410
OPBAT-110	389027.580	3885430.550
OPBAT-111	390336.450	3885426.330
OPBAT-112	390346.080	3885421.500

Appendix C

Special-status plant species locations

(UTM NAD 83 Zone 11S)

Species	Map label	Easting	Northing
Pale-yellow layia	LAHE-1	385903.436	3884206.930
Pale-yellow layia	LAHE-2	388460.421	3884893.170
Pale-yellow layia	LAHE-3	389011.556	3885290.620
Adobe yampah	PEPR5-1	385584.882	3883365.160
Adobe yampah	PEPR5-2	385605.042	3883370.310

Appendix D

Morphological characteristics of *Opuntia basilaris* plants occurring in the Project area

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
OPBAT-1	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-2	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-3	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-4	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-5	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-6	Bakersfield	raised	<8	most spines >6mm	>2 in some areoles	most pads w/ >5	no fruits available
OPBAT-7	Bakersfield	raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-8	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-9	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-10	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-11	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-12	Bakersfield	raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-13	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-14	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-15	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-16	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-17	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-18	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-19	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-20	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-21	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-22	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-23	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-24	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-25	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-26	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-27	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-28	Bakersfield	sunken	>8	most spines <6mm	<2 in all areoles	most pads w/ >5	no fruits available
OPBAT-29	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-30	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-31	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-32	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-33	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-34	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-35	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-36	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-37	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-38	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
OPBAT-39	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-40	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-41	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-42	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-43	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-44	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-45	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-46	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-47	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-48	Bakersfield	raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-49	Bakersfield	sunken	>8	most spines <6mm	<2 in all areoles	most pads w/ >5	no fruits available
OPBAT-50	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-51	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-52	Bakersfield	raised	>8	No spines	No spines	No spines	3-10 per upper areole
OPBAT-53	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-54	Bakersfield	flush	>8	most spines >6mm	<2 in all areoles	most pads w/ >5	no fruits available
OPBAT-55	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-56	Bakersfield	flush	>8	most spines <6mm	<2 in all areoles	most pads w/ <5	no fruits available
OPBAT-57	Bakersfield	raised	>8	most spines <6mm	<2 in all areoles	most pads w/ >5	no fruits available
OPBAT-58	Bakersfield	sunken	>8	most spines <6mm	<2 in all areoles	most pads w/ >5	no fruits available
OPBAT-59	Bakersfield	both sunken & flush	>8	most spines <6mm	<2 in all areoles	most pads w/ >5	no fruits available
OPBAT-60	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-61	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-62	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-63	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-64	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-65	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-66	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-67	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-68	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-69	Bakersfield	both sunken & flush	>8	No spines	No spines	No spines	3-10 per upper areole
OPBAT-70	Bakersfield	flush	<8	No spines	No spines	No spines	no fruits available
OPBAT-71	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-72	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-73	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-74	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-75	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-76	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-77	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-78	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-79	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-80	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-81	Bakersfield	raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-82	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
OPBAT-83	Bakersfield	flush	<8	No spines	No spines	No spines	no fruits available
OPBAT-84	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-85	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-86	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-87	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-88	Bakersfield	sunken	>8	No spines	>2 in some areoles	No spines	no fruits available
OPBAT-89	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-90	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-91	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-92	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-93	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-94	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-95	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-96	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-97	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-98	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-99	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-100	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-101	Bakersfield	raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-102	Bakersfield	raised	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-103	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-104	Bakersfield	raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-105	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-106	Bakersfield	sunken	<8	most spines <6mm	<2 in all areoles	most pads w/ >5	no fruits available
OPBAT-107	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-108	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-109	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-110	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-111	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-112	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	most spines <6mm	<2 in all areoles	most pads w/ <5	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no spines on fruit

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	most spines <6mm	<2 in all areoles	most pads w/ <5	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	1-2 per upper areole

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	Bo	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	1-2 per upper areole
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	most spines <6mm	<2 in all areoles	most pads w/ <5	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	1-2 per upper areole
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	Bo	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	Bo	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	1-2 per upper areol
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	Bo	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	Bo	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	Bo	most spines <6mm	<2 in all areoles	most pads w/ <5	no fruits available
N/A	Beavertail	sunken	>8	most spines <6mm	<2 in all areoles	only 1 on plant	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available

Appendix E

Descriptions of special-status plants not observed, but with the potential to occur on the project site

Inyo Onion (*Allium atrorubens* var. *cristatum*)

Inyo onion is a bulbiferous herb in the Lily family (*Liliaceae*) found on sandy and rocky substrates within Joshua Tree Woodland, Mojavean Desert Scrub, and Pinyon and Juniper Woodland communities. Known occurrences range in elevation from 3,960 to 8,448 feet (CNPS 2011). Inyo onion has no State or Federal listing status but is included on CNPS List 4.3, a watch list (ibid.). The BLM designates it as a Plant of Interest (BLM 2010).

In California, Inyo onion has been found in Inyo, Kern, and San Bernardino counties (CNPS 2011). This variety is also known to occur in Nevada. The nearest known location is 42 mi northeast of the Project area in the Owens Peak watershed (CCH 2011).

Although suitable habitat is present, it is unlikely that Inyo onion would occur in the Project area since this variety has not been documented south of the Owens Peak watershed. Botanical surveys conducted by GANDA in April and May, during the flowering period of Inyo onion (April to June), did not detect this species within the survey area. Only one species of *Allium* was detected within the Project area, fringed onion (*A. fimbriatum* var. *fimbriatum*).

Spanish Needle onion (*Allium shevockii*)

Spanish Needle onion is a bulb-forming perennial herb in the Lily family (*Liliaceae)* that is 6-9 inches tall. It has showy flowers, with tepals (petal-like flower parts) that are white to light green below and maroon on the reflexed and curled distal half (Hickman 1993). The flowering time is from May to June (CNPS 2011). Spanish Needle onion is typically found on talus or loose, deep gravel derived from dark-colored granitic or andesitic rock, in Pinyon and Juniper Woodland and Upper Montane Coniferous Forest (CNPS 2011). It ranges in elevation from 2,800 to 8,200 feet (CNPS 2011). Spanish Needle onion has no State or Federal listing status, but is included on CNPS List 1B.3, indicating that it is rare, threatened or endangered in California and elsewhere, with a low threat level in California (ibid.). It is designated by the BLM as a Special-Status species (BLM 2010).

Spanish Needle onion is known only from Kern County, on or near the crest of the southern Sierra Nevada (CNPS 2011). The largest known population, with several thousand individuals, occurs on Spanish Needle Peak (Pitzer 2010). The nearest known location is 8 mi west of the Project area near upper Horse Canyon about 4 miles upstream from Sand Canyon (CNDDB 2011).

No suitable talus slope habitats for Spanish Needle onion occur in the Project area, and the species is unlikely to occur. Surveys conducted by GANDA in May, during the flowering period (April – June), failed to detect the species.

California androsace (*Androsace elongata* ssp. *acuta*)

California androsace is a white-flowered annual herb in the Primrose Family (Primulaceae). It is the only subspecies of *Androsace elongata* known to occur in California (USFS 2005). It is found in Grassland,

Chaparral, Coastal Sage Scrub, Semi-Desert Shrub, Pinyon and Juniper Woodland, and Cismontane Woodland communities at elevations of 1,000 to 3,940 feet (CNPS 2011). It typically occurs where vegetation cover is low and mesic conditions are present, such as on and adjacent to moss-covered soil or rock outcrops on north-facing slopes or along rocky washes (USFS 2005). It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, California androsace has been found in many counties throughout the state. The nearest known location is 20 mi west of the Project area in the Tehachapi Mountains near Keene Station (CCH 2011).

There is only marginally suitable habitat for California androsace in the Project area. Botanical surveys conducted by GANDA during the flowering period of California Androsace (March to June) did not detect the subspecies within the Project area. However, the subspecies is small and inconspicuous, and it is possible, but unlikely, that it occurs within the Project area.

Horn's milk-vetch (*Astragalus hornii var. hornii*)

Horn's milk-vetch is an annual herb in the Pea family (Fabaceae) found in Meadow and Seep and Playa communities. It is often associated with lake margins and alkaline substrates. It ranges in elevation from 200 to 2,790 feet (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 1B.1, indicating that it is rare, threatened or endangered in California and elsewhere, with a high threat level in California (ibid.).

In California, Horn's milk-vetch has been found in Inyo, Kern, San Bernardino, and Tulare counties. It is also know to occur in Nevada (CNPS 2011). The nearest known location is 15 mi south of the Project area in Willow Springs. (CNDDB 2011).

No suitable mesic alkaline habitats for this species occur in the Project area. The species was not observed in surveys conducted just prior to its flowering period, and no unidentified vegetative *Astragalus* species were observed.

Alkali mariposa-lily (*Calochortus striatus*)

Alkali mariposa lily is a bulbiferous herb in the Lily family found on mesic alkaline substrates within Chaparral, Chenopod Scrub, and Mojave Desert Scrub communities. It is often associated with meadows, seeps and alkali flats. Known occurrences range in elevation from 200 to 5,300 feet. It has no State or Federal listing status, but is included on CNPS List 1B.2, indicating that it is rare, threatened or endangered in California and elsewhere, and fairly endangered in California.

In California, alkali mariposa has been found in Kern, Los Angeles, and San Bernardino and Tulare counties. This species is also known to occur in southern Nevada (CNPS 2011). The nearest known location is 12 mi south of the Project area along Sierra Highway between Sopp Road and Backus Road (CNDDB 2011).

It is unlikely that alkali mariposa lily would occur on the Project area. There are no large alkali flats, seeps or meadows within the Project area, however some of the washes may provide marginal habitat for this species. No occurrences of this species were observed during botanical surveys conducted by GANDA during the flowering period for this species, April to June. Only the common desert mariposa lily (*Calochortus kennedyi*) was observed within the Project area. Alkali mariposa lily can be distinguished in the field from other *Calochortus* species by the distinctive purple veins on the otherwise light pink petals.

Kern County evening-primrose (*Camissonia kernensis* ssp. *kernensis*)

Kern County evening-primrose is an annual herb in the Evening Primrose family (Onagraceae) with small, but conspicuous four petaled yellow flowers. It is typically found in Chaparral, Joshua Tree Woodland, and Pinyon and Juniper Woodland on sandy or gravelly substrates (CNPS 2011). It ranges in elevation from 2,607 to 7,029 feet. It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list.

In California, Kern County evening-primrose is endemic to Kern and Santa Barbara counties (CNPS 2011). In Kern County, most documented occurrences of this subspecies occur in the Scodie Mountain's of the southern Sierra Nevada's near Walker Pass. The nearest known location is 4 mi south of the Project area about 3 miles west of Hwy 14 on Oak Creek Drive (CCH 2011).

Although suitable habitat is present in the Project area within Joshua Tree Woodland, botanical surveys conducted by GANDA during the flowering period of Kern County evening-primrose (March to May) did not detect the subspecies within the Project area. Only the more common species, Booth's evening primrose (*Camissonia boothii*), brown eyes (*Camissonia claviformis*), Mojave suncup (*C. campestris*), Palmer's evening primrose (*C. palmeri*), and pale yellow suncup (*C. pallida*) were observed.

White pygmy-poppy (*Canbya candida*)

White pygmy-poppy is a diminutive annual herb in the Poppy family (Papaveraceae) with small white flowers. It is typically found on gravelly, sandy, and granitic substrates in Joshua Tree Woodland, Mojavean Desert Scrub, and Pinyon and Juniper Woodland from 1,900 to 4,800 ft. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, white pygmy-poppy is known from Imperial, Inyo, Kern, Los Angeles, and San Bernardino counties (CNPS 2011). The nearest known location is 4 mi east of the Project area 2 miles north of Mojave. (CNDDB 2011).

Although suitable habitat for white pygmy-poppy occurs in the Project area within Joshua Tree Woodland, and Creosote Bush Scrub, botanical surveys conducted by GANDA during the flowering period (March to June) did not detect the species. White pygmy-poppy is the only species in the genus *Canbya*, and no similar species were observed.

Mojave paintbrush (*Castilleja plagiotoma*)

Mojave paintbrush is a hemiparasitic perennial herb in the Figwort family (*Scrophulariaceae*). It reaches 40 inches in height, and produces multiple stalks of inconspicuous yellow-green flowers that bloom from April to June (Hickman 1993, CNPS 2011). It is found in Great Basin Scrub, Joshua Tree Woodland, Lower Montane Coniferous Forest, and Pinyon and Juniper Woodland communities, often on alluvial soils (CNPS 2011). It is reported at elevations ranging from 900 to 8,000 feet (ibid.). Mojave paintbrush has no State or Federal listing status, but is included on CNPS List 4.3, a watch list (ibid.).

Mojave paintbrush is endemic to California, and has been reported in Los Angeles, San Bernardino, San Luis Obispo, Kern, Santa Barbara, San Benito, Fresno, Ventura, and Riverside counties (CCH 2011). This species has been observed by GANDA to occur in the greater AOCM Project area, but does not occur in the current project.

Although suitable habitat for Mojave paintbrush occurs in the Project area within Joshua Tree Woodland, California Juniper Woodland, and Creosote Bush Scrub, botanical surveys conducted by GANDA during the flowering period did not detect the species.

Death Valley sandmat (*Chamaesyce vallis-mortae*)

Death Valley sandmat is a perennial prostrate herb in the Spurge family (Euphorbiaceae). It is typically found in Mojavean Desert Scrub habitats on sandy or gravelly substrates (CNPS 2011). Known occurrences range in elevation from 760 to 4,800 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, Death Valley sandmat is known from Inyo, Kern, and San Bernardino counties in the Mohave Desert (CNPS 2011). The closest known location to the Project area is near the Kelso Valley about 15 miles northeast of the Project area (E. Kentner pers. obs.)

Although suitable habitat for Death Valley sandmat occurs in the Project area within Creosote Bush Scrub, botanical surveys conducted by GANDA outside of the flowering period of Death Valley sandmat (May to October) did not detect the species within the Project area. This species was observed to be easily detectable at a reference population located about ten miles north of the Project area on May, 3, 2011. Only the common species white margin sandmat (*Chamaesyce albomarginata*) was observed in the Project area.

Mojave spineflower (*Chorizanthe spinosa*)

Mojave spineflower is an annual herb in the Knotweed family (Polygonaceae) that has inconspicuous flowers that are only 3 mm long. There are generally five bracts per flower, with one bract much longer than the others. It is typically found in Chenopod Scrub, Joshua Tree Woodland, and Mojavean Desert Scrub habitat. (CNPS 2011). Known occurrences range in elevation from 20 to 4,290 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, Mojave spineflower is endemic the west Mohave Desert within Kern, Los Angeles, and San Bernardino counties (CNPS 2011). The nearest known location is 5 mi southeast of the Project area in Mohave (CCH 2011).

Only marginal habitat for Mojave spineflower occurs in the Project area on moderately alkaline soils. Botanical surveys conducted by GANDA during the flowering period of Mojave spineflower, March to July, did not detect the species within the Project area. Only the more common species, brittle spineflower (*Chorizanthe brevicornu*) and fivetooth spineflower (*C. watsonii*) were observed.

Kern Canyon clarkia (*Clarkia xantiana* ssp. *parviflora*)

Kern Canyon clarkia is an annual herb in the Evening Primrose family with conspicuous four petaled pink flowers that are notched at the tip. It is typically found in Chaparral, Cismontane Woodland, Great Basin Scrub, and Valley and Foothill Grassland habitats, often on sandy, sometimes rocky slopes (CNPS 2011). It ranges in elevation from 2,310 to 11,950 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, Kern Canyon clarkia is endemic to Inyo, Kern, Los Angeles, and Tulare counties (CNPS 2011). In Kern County, all known occurrences of this subspecies occur in the southern Sierra Nevada. The nearest known location is 26 mi northwest of the Project area about 2 mi west of Kelso Valley Road, off of the road to Piute Mountain (CNDDB 2011).

Very little marginally suitable habitat for this species is present in the Project area. Botanical surveys conducted by GANDA during the flowering period of Kern Canyon clarkia (May to June) did not detect the subspecies within the Project area. No *Clarkia* species were observed during the surveys.

Short-bracted bird's-beak (*Cordylanthus rigidus* ssp. *brevibracteatus*)

Short-bracted bird's-beak is a many branched annual species in the Figwort family that is found in the southern Sierra Nevada floristic province (Hickman 1993). It occurs in the understory and in granitic openings within Chaparral, Lower and Upper Montane Coniferous Forest, Pinyon and Juniper Woodland vegetation communities at elevations between 3,000 and 7,000 feet (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list.

Short-bracted bird's beak is endemic to California. It has been reported to occur in Kern, Tulare, Fresno and Mariposa counties. The nearest known location is 12 mi west of the Project area in Antelope Canyon south of Tehachapi (CCH 2011).

Little suitable habitat for short-bracted bird's beak occurs in the Project area. Surveys conducted by GANDA from April to May did not detect any *Cordylanthus* species. Although, short-bracted bird's beak blooms from July to August, vegetative individuals would have been detectable at the time of the surveys. It can be can be distinguished from the common rigid bird's beak (*Cordylanthus rigidus* ssp. *rigidus*) by the conspicuously shorter length of the flower bracts subtending the flowers as compared to flower bracts that are as large or larger than the flowers (Hickman 1993).

Mojave tarplant (*Deinandra mohavensis*)

Mojave tar plant is an annual tar plant in the Sunflower family with sessile clusters of small yellow flowers. It grows to a height of approximately 36 inches tall, and is typically found in Chaparral, Coastal Scrub, Riparian Scrub and mesic community types, in washes or around springs at elevations between 1,800 and 4,000 feet (CNPS 2011). It is State listed and Endangered, has no Federal listing status, and is included on CNPS List 1B.3, indicating that it is rare, threatened or endangered in California and elsewhere, but not very endangered in California.

In California, Mojave tar plant is known to occur in Kern, San Bernardino, Riverside, and San Diego counties. The closest known occurrence of Mojave tar plant is over 20 miles north of the Project area near a spring on Mount Cross in Jawbone Canyon (CCH 2011). There are other known occurrences in Kelso Valley, over 20 miles north of the Project area. These occurrences were found in drainages and on low hillslopes near drainages on granitic substrate within a recent burn (CCH 2011).

Suitable habitat for this species occurs on the Project area in washes and/or drainages. Botanical surveys conducted by GANDA in May did not detect any species of the genus on the Project area. However, the flowering time for Mojave tar plant is from June to September, and although it is unlikely to occur, additional surveys are required to rule out its presence.

Gypsum-loving larkspur (*Delphinium gypsophilum* ssp. *gypsophilum*)

Gypsum-loving larkspur is a showy 15 to 40 inch tall perennial larkspur in the Buttercup family with a central stalk of dense white flowers. Habitat for the species includes Chenopod Scrub, Cismontane Woodland and Valley and Foothill Grassland plant community types (CNPS 2011) at elevations up to 6,000 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

Gypsum-loving larkspur is endemic to California and has been reported in Alameda, Fresno, Kings, Kern, Madera, Merced, Monterey, San Benito, San Joaquin, San Luis Obispo, Stanislaus, and Ventura counties. It is reported to occur in the Southern Sierra and Tehachapi Floristic provinces. The occurrences of gypsum-loving larkspur in the Tehachapi area are on open hill slopes often associated with "light colored soils", most likely derived from calcareous substrates (CCH 2011). The nearest known location is 3 mi west of the Project area on the north slope of Tehachapi Pass (CCH 2011).

Potential habitat for gypsum-loving larkspur is present within the Project area, but the species was not found during surveys conducted by GANDA during the flowering period from February to May. Only one other larkspur species was found in the Project area, desert larkspur (*Delphinium parishii*). Gypsum-loving larkspur can be distinguished from the other larkspur species of the region by its pinkish white flowers, as compared to the lighter blue flowers of desert larkspur (Hickman 1993).

Mt. Pinos larkspur (*Delphinium parryi* ssp. *purpureum*)

Mt. Pinos larkspur is a 10 to 36 inch tall perennial larkspur in the Buttercup family (Ranunculaceae) with one to several flowering stalks of deep purple to light blue flowers. It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list. It is found within the Chaparral, Mojavean Desert Scrub, Pinyon and Juniper Woodland plant community types at elevations between 3,000 and 8,000 feet (CNDDB 2011).

Mt. Pinos larkspur is endemic to California and is reported to occur in Kern, Santa Barbara and Ventura counties. It is likely that this species is more wide spread than reported, as it was observed to occur in the greater ACOM Project area in surveys conducted in 2010. There are many records of *Delphinium parryi* near the Project area for which the subspecies is not noted (CCH 2011).

Only marginally suitable habitat for this species occurs within the Project survey area, and only the closely related common species desert larkspur (*Delphinium parishii*) was observed during the surveys. However, the surveys were conducted prior to the flowering period of Mt. Pinos larkspur, and additional surveys for this species are planned.

Limestone dudleya (*Dudleya abramsii ssp. calcicola*)

Limestone dudleya is a perennial herb in the Stonecrop family (Crassulaceae) with fleshy leaves in a basal rosette. It is typically found in Chaparral and Pinyon and Juniper Woodland on carbonate substrates (CNPS 2011). It ranges in elevation from 1,640 to 8,528 feet. It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list.

Limestone dudleya is endemic to California and has been found in Inyo, Kern, and Tulare counties (CNPS 2011). The nearest known location is 17 mi northwest of the Project area about 1.5 mi north of Twin Oaks in the southern Piute Mtns (CCH 2011).

Although suitable habitat for this species is present in the Project area, botanical surveys conducted by GANDA during the flowering period of limestone dudleya (April to August) did not detect the species within the Project area. No species of this genus were observed.

Hoover's eriastrum (*Eriastrum hooveri*)

Hoover's eriastrum is an annual herb in the Phlox family (Polemoniaceae) found in Chenopod Scrub, Pinyon and Juniper Woodland, and Valley and Foothill Grassland communities (CNPS 2011). It ranges in elevation from 160 to 3,000 feet (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, Hoover's eriastrum has been found in Fresno, Kings, Kern, Los Angeles, Santa Barbara, San Benito, and San Luis Obispo counties and is considered a Californian endemic. The nearest known location is 22 mi south of the Project area on the southwest edge of Rosamond Dry Lake (CCH 2011).

Marginally suitable habitat for this species is present in the Project area, but the species was not observed in surveys conducted during the flowering period. However, many vegetative *Eriastrum* plants were

observed in the project area during the surveys, and a additional surveys are planned to identify all species of this genus that occur in the Project.

Tracy's eriastrum (*Eriastrum tracyi*)

Tracy's eriastrum is an annual species in the Phlox family that is up to 20 cm in height with small, generally blue flowers. It is primarily known to occur in Chaparral and Cismontane vegetation types, at elevations between 1,040-3,220 feet (CNPS 2011). Tracy's eriastrum has recently been resurrected as a species (Gowen 2008). It was first described by Mason (1945), and later combined with Brandegee's eriastrum in the Jepson manual (Hickman 1993). It is State listed as rare, has no Federal listing status, and is included on CNPS List 1B.2, indicating that it is rare, threatened or endangered in California and elsewhere, and fairly endangered in California.

Recent investigations of herbarium records have determined that six records of Great Basin woollystar (*E. sparsiflorum*) within Kern County are actually Tracy's eriastrum. The nearest known location is 12 mi north of the Project area about 1.5 miles northeast of Emerald Mountain (CNDDB 2011).

Although suitable habitat is present in the Project area, botanical surveys conducted by GANDA occurred outside of the flowering period of Tracy's eriastrum. Because annual *Eriastrum* species are extremely difficult to identify when not in flower, additional late-season surveys are required to rule out the presence of this species in the Project area.

White-flowered rabbitbrush (*Ericameria albida*)

White-flowered rabbitbrush is a perennial shrub in the Sunflower family, with white flowers and green, gland dotted herbage (Hickman 1993). It is associated with Chenopod Scrub and Alkaline Playa plant community types, often around meadows and seeps at elevations between 900 and 6,000 feet (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

White-flowered rabbitbrush is found in Utah, Nevada and California and is locally rare in California. It has only been reported in Inyo, Kern, Mono and San Bernardino counties. The nearest known location is 50 mi northeast of the Project area in Indian Wells Valley (CCH 2011).

White-flowered strongly associated with alkaline soils and would not be expected to occur out of this habitat (Hickman 1993). Suitable habitat is present on the Project area in a few alkaline areas, but this habitat is very limited and it is unlikely that this species would occur. White-flowered rabbitbrush can be distinguished from other species of rabbitbrush by its distinctive white flowers that bloom from June to November. Four other species of *Ericameria* (=*Chrysothamnus*) were found on the Project area.

Kern buckwheat (*Eriogonum kennedyi* var. *pinicola*)

Kern buckwheat is a perennial mat forming buckwheat in the Knotweed family. It occurs in Chaparral and Pinyon and Juniper Woodland at elevations between 6,000 ft and 6,100 ft (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 1B.1, indicating that it is rare, threatened or endangered in California and elsewhere, and seriously endangered in California.

Kern buckwheat is only known from Sweet Ridge and Pine Tree Canyon in Kern County, California (CCH 2011). Sweet Ridge is located approximately 14 mi northeast of the Project area. Pine Tree Canyon is located approximately 12 miles north of the Project area.

No suitable habitat for this species is present in the Project area, and botanical surveys conducted by GANDA outside of the flowering period (May to June) did not detect the species. The only perennial *Eriogonum* species observed were Eastern Mojave buckwheat (*E. fasciculatum* var. *polifolium*), yucca

buckwheat (*E. plumatella*), and Heerman's buckwheat (*E. heermannii*). None of the observed perennial species have a growth form similar to Kern buckwheat.

Barstow woolly sunflower (*Eriophyllum mohavense*)

Barstow woolly sunflower is an annual herb 1-2 inches tall in the Sunflower family. It is typically found in Chenopod scrub, Mojavean desert scrub and Playas from 1,600 to 3,200 ft in elevation (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 1B.2, indicating that it is rare, threatened or endangered in California and elsewhere, and fairly endangered in California.

In California, the Barstow woolly sunflower is known from Fresno, Kern, Los Angeles, and San Bernardino counties (CNPS 2011). The nearest occurrence to the Project area is approximately 20 miles to the east on Edwards Air force Base. This occurrence was found on clay swales and abraded areas within Chenopod scrub (CCH 2011).

Marginal habitat for Barstow woolly sunflower occurs in the Project area, but the species is not known to occur west of Edwards Air Force Base. Barstow woolly sunflower was not observed during the botanical inventory conducted by GANDA during the flowering period (March to May).

Inland gilia (*Gilia interior*)

Inland gilia is an annual herb in the Phlox family with small purple flowers with yellow throats. It is typically found in Cismontane Woodland, Joshua Tree Woodland, and Lower Montane Coniferous Forest on rocky substrates (CNPS 2011). Known occurrences range in elevation from 2,296 to 5,576 feet. It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list.

In California, inland gilia is endemic to Kern and Tulare counties (CNPS 2011). The nearest known location is 23 mi south of the Project area west of Lancaster at 125th St. and Hwy 138 (CCH 2011).

Although suitable habitat is present in the Project area within Joshua Tree Woodland, botanical surveys conducted by GANDA during the flowering period of inland Gilia (March to May) did not detect the species. Several more widespread species on *Gilia* were observed.

Cuyama gilia (*Gilia latiflora ssp. Cuyamensis*)

Cuyama gilia is an annual herb in the Phlox family (Polemoniaceae) found in Pinyon and Juniper Woodland communities. It is often associated with sandy substrates (CNPS 2011). It ranges in elevation from 1,970 to 6,560 feet (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list.

In California, Cuyama gilia has been found in Kern, Los Angeles, Santa Barbara, San Luis Obispo, and Ventura counties (CNPS 2011). The nearest known location is 33 mi south of the Project area in the vicinity of Ritter Ridge on the south side of the Antelope Valley (CCH 2011).

Although suitable habitat is present in the Project area, botanical surveys conducted by GANDA during the flowering period of Cuyama Gilia (April to June) did not detect the species. Several more widespread species on *Gilia* were observed.

Golden goodmania (*Goodmania luteola*)

Golden goodmania is a small, spreading annual herb in the Knotweed family that is thinly hairy throughout and has small yellow flowers. It is typically found in Mojavean Desert Scrub, Meadows and Seeps, Playas, and Valley and Foothill Grassland on alkaline or clay substrates (CNPS 2011). Known

occurrences range in elevation from 65 to 7,216 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, golden goodmania has been found in Fresno, Inyo, Kern, Los Angeles, Madera, Mono, and Tulare counties (CNPS 2011). The nearest known location is 21 mi east of the Project area 8 mi north of Muroc (CCH 2011).

Marginal habitat for golden goodmania occurs in the Project area, but botanical surveys conducted by GANDA during the flowering period of golden goodmania (April to August) did not detect the species within the Project area. No similar species were observed.

Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*)

Coulter's goldfields is an annual herb in the Sunflower family with yellow-orange flowers. It is typically found in Coastal Salt Marshes and Swamps, Playas, and Vernal Pools, often in saline environments (CNPS 2011). It ranges in elevation from sea level to 4,000 feet. It has no State or Federal listing status, but is included on CNPS List 1B.1, indicating that it is rare, threatened or endangered in California and elsewhere, and seriously endangered in California.

In California, Coulter's goldfields has been found in Colusa, Kern, Los Angeles, Merced, Orange, Riverside, Santa Barbara, San Bernardino, San Diego, San Luis Obispo, Tulare, and Ventura counties (CNPS 2011). The nearest known location is 12 mi west of the Project area in Tehachapi (CNDDB 2011).

Only a small amount of marginally suitable habitat for Coulter's goldfields is present within the Project area. Botanical surveys conducted by GANDA during the flowering period of Coulter's goldfields, (February to June) did not detect the species. Only the common California goldfields (*L. californica*) was observed within the Project area during surveys. This species is distinguished from Coulter's goldfields by having free phyllaries and hairy leaves.

Sagebrush loeflingia (*Loeflingia squarrosa var. artemisiarum*)

Sagebrush loeflingia is an annual herb in the Pink family (Caryophyllaceae) that is generally under 7 cm tall. It is typically found in desert Dunes, Great Basin Scrub, and Sonoran Desert Scrub in sandy habitats (CNPS 2011). Known occurrences range in elevation from 2,310 to 5,330 feet. It has no State or Federal listing status, but is included on CNPS List 2.2, indicating that it is rare, threatened or endangered in California, but more common elsewhere.

In California, sagebrush loeflingia is found in Inyo, Kern, Lassen , Los Angeles , Plumas, and San Bernardino counties. It is also found in Nevada, Oregon, and Wyoming (CNPS 2011). The nearest known location is 10 mi southeast of the Project area northeast of Acton (CNDDB 2011).

Although marginally suitable habitat is present in the Project area, botanical surveys conducted by GANDA during the flowering period of sagebrush Loeflingia (April to May) did not detect the species. No similar-appearing species were observed.

Solitary blazing star (*Mentzelia eremophila*)

Solitary blazing star is an annual herb in the Loasa family (Loasaceae). It is typically found in Mojavean Desert Scrub communities in canyons, washes, and on rocky slopes within the western Mojave Desert region (CNPS 2011). Known occurrences range in elevation from 2,310 to 4,025 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, solitary blazing star is endemic to Inyo, Kern, and San Bernardino counties (CNPS 2011). The nearest known location is 9 mi north of the Project area on the east side of Barren Ridge, about 7.5 mi northwest of California City (CCH 2011).

Although some suitable habitat is present in the Project area, botanical surveys conducted by GANDA during the flowering period of solitary blazing star (March to May) did not detect the species within the Project area. Only the widespread species whitestem blazingstar (*M. albicaulis*) and Veatch's blazingstar (*M. veatchiana*) were observed in the Project area. Solitary blazing star is readily distinguishable from the observed common species by its larger flower size (12-24 millimeters).

Sylvan microseris (*Microseris sylvatica*)

Sylvan microseris is a perennial herb in the Sunflower family. It is typically found in Chaparral, Cismontane Woodland, Great Basin Scrub, Pinyon and Juniper Woodland, and Valley and Foothill Grassland habitats (CNPS 2011). Known occurrences range in elevation from 150 to 4,950 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, sylvan microseris has a broad distribution, occurring in 20 counties from southern California to northern California, including the western Mojave Desert (CNPS 2011). The nearest known location is 12 mi west of the Project area in Tehachapi (CCH 2011).

Although some suitable habitat is present in the Project area, botanical surveys conducted by GANDA during the flowering period of sylvan Microseris (March to June) did not detect the species within the Project area. No species of *Microseris* were observed.

Calico monkeyflower (*Mimulus pictus*)

Calico monkeyflower is an annual herb in the Figwort family. It is typically found in Broadleafed Upland Forest and Cismontane Woodland habitats within granitic or disturbed areas (CNPS 2011). It ranges in elevation from 330 to 4,290 feet. It has no State or Federal listing status, but is included on CNPS List 1B.2, indicating that it is rare, threatened or endangered in California and elsewhere, and fairly endangered in California.

In California, calico monkeyflower is endemic to Kern and Tulare counties (CNPS 2011). The nearest known location is 6 mi northwest of the Project area near a tributary to Cache Creek/Sand Canyon, northeast of Monolith (CNDDB 2011).

No suitable habitat for this species occurs in the project area, and botanical surveys conducted by GANDA during the flowering period (March to May) did not detect the species. No species of monkeyflower were observed within the Project area.

Tehachapi monardella (*Monardella linoides* ssp. *oblonga*)

Tehachapi monardella is a perennial herb in the Mint family (Lamiaceae) with bracted heads of whitish, lavender, or pale purple flowers. Tehachapi monardella has no State or Federal listing status, but is included on CNPS List 1B.3, indicating that it is "rare, threatened or endangered in California and elsewhere", but is "not very endangered in California" (CNPS 2011).

Typical habitats include Lower Montane Coniferous Forest, Upper Montane Coniferous Forest, and Pinyon and Juniper Woodland, where it is found on dry slopes with decomposed granitic soils, and in roadside disturbed areas at elevations between 5,560 and 8,100 feet (CNDDB 2011). The nearest known location is 8 mi north of the Project area about 0.8 mi SE of Cache Peak (CCH 2011)

Botanical surveys conducted by GANDA prior to the flowering period of Tehachapi monardella (June to August) did not detect the species. Although the surveys were conducted outside of the flowering period, the species is a perennial and should have been easily detectable at the time of the surveys. This species has been documented to occur in the greater ACOM Project area, but only marginally suitable habitat exists within the Alta East botanical survey area.

Crowned muilla (*Muilla coronata*)

Crowned muilla is a small 3-15 cm tall bulbiferous herb in the Lily family. It typically occurs in Joshua Tree Woodland, Pinyon and Juniper Woodland, and Mojavean Desert Scrub, most often on barren flats and ridges in sandy, granitic soils (CNPS 2011; CNDDB 2011). Known occurrences range in elevation from 3280 to 5250 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, crowned muilla is known from Inyo, Kern, Los Angeles, San Bernardino, and Tulare counties. The nearest known location is 7 mi west of the Project area off of Oak Creek Rd., 9 mi west of Mojave (CCH 2011).

Although suitable habitat is present in the Project area, botanical surveys conducted by GANDA during the flowering period (March to April) did not detect the species. No similar species were observed to occur within the Project area.

Piute Mountains navarretia (*Navarretia setiloba*)

Piute Mountains navarretia is an annual herb in the Phlox family. It is typically found in Cismontane Woodland, Pinyon and Juniper Woodland, and Valley and Foothill Grassland habitats in clay or gravelly loam substrates (CNPS 2011). Known occurrences range in elevation from 1,000 to 6,930 feet. It has no State or Federal listing status, but is included on CNPS List 1B.1, indicating that it is rare, threatened or endangered in California and elsewhere, and seriously endangered in California.

In California, Piute Mountains navarretia is endemic to Kern, Los Angeles, and Tulare counties (CNPS 2011). The nearest known location is 24 mi northwest of the Project area on Piute Mountain Road, <3 miles from the Caliente Bodfish Road (CNDDB 2011).

Although some suitable habitat is present in the Project area, botanical surveys conducted by GANDA during the flowering period of Piute Mountains Navarretia (April to July) did not detect the species within the Project area. No species of this genus were observed.

Slender threadplant (*Nemacladus gracilis*)

Slender threadplant is an annual herb in the Bellflower family (Campanulaceae). It is typically found in Cismontane Woodland and Valley and Foothill Grassland habitats on sandy or gravelly substrates (CNPS 2011). It ranges in elevation from 400 to 6,270 feet. It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list.

In California, slender threadplant is endemic to Fresno, Kings, Kern, Los Angeles, and Merced counties (CNPS 2011). The nearest known location is 9 mi west of the Project area in Oak Creek Canyon, 1.8 miles southwest of intersection of Oak Creek Rd and Tehachapi Willow Springs Rd (CCH 2011).

Although some suitable habitat is present in the Project area, botanical surveys conducted by GANDA during the flowering period of slender threadplant (March to May) did not detect the species within the Project area. Only the more widespread species eastern threadplant (*N. orientalis*) was observed.

Large-flowered nemacladus (*Nemacladus secundiflorus var. secundiflorus*)

Large-flowered nemacladus is an annual herb in the Bellflower family (Campanulaceae) found in Chaparral and Valley and Foothill Grassland communities. It ranges in elevation from 650 to 6,500 feet (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 4.32, a watch list.

In California, large-flowered nemacladus has been found in Kern, Monterey, San Luis Obispo, and Tulare counties (CNPS 2011). The nearest known location is 45 mi north of the Project area on Greenhorn Mountain (CCH 2011).

Although some suitable habitat is present in the Project area, botanical surveys conducted by GANDA during the flowering period of large-flowered nemacladus (April to June) did not detect the species within the Project area. Only the more widespread species eastern threadplant (*N. orientalis*) was observed.

Fragile pentachaeta *(Pentachaeta fragilis)*

Fragile pentachaeta is a diminutive 2 to 6-inch tall annual herb in the Sunflower family (*Asteraceae*). It has alternate leaves that are ciliate on the edges and yellow flower heads with 7-12 ray flowers (Hickman 1993). Fragile pentachaeta flowers from March to June (CNPS 2011). It grows in Chaparral, Foothill Grasslands and Lower Montane Coniferous Forest communities, in loose sandy or loamy soils (CNPS 2011, Hickman 1993). Known occurrences of fragile pentachaeta range in elevation from 100 to 7,000 feet. Fragile pentachaeta has no State or Federal listing status, but is included on CNPS List 4.3, a watch list (CNPS 2011).

Fragile pentachaeta is endemic to California, and has been reported in Kern, Madera, Merced, Monterey, Santa Barbara, San Luis Obispo, Tuolumne, Ventura and Los Angeles counties (CNPS 2011). The nearest known location is 17 mi north of the Project area in the Kelso Valley (CCH 2011).

Although marginally suitable habitat for this species is present in the Project area, the species was not observed during botanical surveys conducted by GANDA during the flowering period. No similar species were observed.

Hubby's phacelia (*Phacelia cicutaria* var. *hubbyi*)

Hubby's phacelia is a 5 to 30 inch tall annual herbaceous plant in the Waterleaf family with white to lavender colored flowers clustered in dense cymes (Hickman 1993). It is typically found in Chaparral, Coastal Scrub and Valley and Foothill Grassland plant community types, most often on gravelly, rocky, and talus slopes (CNPS 2011; Hickman 1993). It ranges in elevation from sea level to 3,300 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

Hubby's phacelia is endemic to California and has been reported to occur in Los Angeles, Ventura, Santa Barbara, Kern and Orange counties (CNPS 2011). The nearest known location is 17 mi north of the Project area near Jawbone canyon (CCH 2011).

Although suitable habitat for this species is present in the Project area, the species was not observed during botanical surveys conducted by GANDA during the flowering period (April to June). Several other species of *Phacelia*, including distant phacelia (*Phacelia distans*), which has shorter straight calyx lobes, were observed on the Project area. Hubby's phacelia can be distinguished from other varieties of caterpillar phacelia (*P. cicutaria*) by its continuously dense inflorescence and by the shaggy/wavy hairs on the calyx or outer flower parts.

Transverse Range phacelia (*Phacelia exilis*)
Transverse Range phacelia is a lavender-flowered annual herb in the Waterleaf family, found in Lower and Upper Montane Coniferous Forest communities. It is often associated with meadows, seeps, pebble plains, and sandy and gravelly substrates. It ranges in elevation from 3,630 to 8,910 feet (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list (ibid.).

Transverse Range phacelia is endemic to California, where it has been found in Kern, Los Angeles, San Bernardino, Tulare, and Ventura counties (CNPS 2011). The nearest known location is 24 mi northwest of the Project area to the southeast of Piute Peak (CCH 2011).

No suitable habitat for Transverse Range phacelia is present in the Project area and it is unlikely this species occurs there. It was not detected in botanical surveys conducted by GANDA during the flowering period of this species (May to August). Several other *Phacelia* species observed in the study area (Appendix A). Transverse Range phacelia can be distinguished from the other *Phacelia* species observed in the Project area by flower color, growth form, or seed characteristics.

Charlotte's phacelia (*Phacelia nashiana*)
Charlotte's phacelia is an annual herbaceous plant in the Waterleaf family. It is typically found on granitic, rocky or sandy substrates in Joshua Tree Woodland, Mojavean Desert Scrub, and Pinyon and Juniper Woodland. Known occurrences range in elevation from 1,900 to 7,300 feet. It has no State or Federal listing status, but is included on CNPS List 1B.2, indicating that it is rare, threatened or endangered in California and elsewhere, and fairly endangered in California.

In California, Charlotte's phacelia is known from Inyo, Kern, and Tulare counties (CNPS 2011). The nearest known location is 9 mi northeast of the Project area on an east slope of Barren Ridge, about 4.5 miles southwest of the mouth of Pine Tree Canyon (CNDDB 2011).

Although suitable habitat for this species is present in the Project area, the species was not observed during botanical surveys conducted by GANDA during the flowering period (March to June). Several other *Phacelia* species observed in the study area (Appendix A). Charlotte's phacelia can be distinguished from the observed *Phacelia* species by its larger bright blue flowers.

Mojave indigo-bush (*Psorothamnus arborescens* var. *arborescens*)
Mojave indigo-bush is a perennial shrub in the Pea family that grows up to 3.5 feet tall and has deep purple or indigo flowers and ½ inch long gland dotted fruits (Hickman 1993). It is typically found in Mojavean Desert Scrub and Riparian Scrub plant community types on stony flats and granitic bedrock (CNPS 2011). It has been reported to occur at elevations between 1,200 and 4,000 feet (CCH 2011; CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list.

In California, Mojave indigo-bush has been reported from Kern, Inyo, and San Bernardino counties and also in the Sonora desert in Mexico (CNPS 2011). The nearest known location is 24 mi north of the Project area in Red Rock Canyon (CCH 2011).

Although suitable habitat for this species is present in the Project area within Creosote Bush Scrub, the species was not observed during botanical surveys conducted by GANDA during the flowering period (April to May). No species of *Psorothamnus* were observed during the surveys.

Mojave fish-hook cactus (*Sclerocactus polyancistrus*)
Mojave fish-hook cactus is a small cylindrical (4-12 inch tall by 2-3 inch wide), unbranched, cactus with clusters of 9-11 hooked spines and rose to magenta colored flowers (Hickman, 1993). It is typically

found in Joshua Tree Woodland, Great Basin Scrub, and Mojavean Desert Scrub plant community types on well-drained soil, rocky gravelly mesas, slopes and outcrops, often of calcareous substrate (CNPS 2011). It has been reported to occur at elevations between 1,800 and 7,500 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

Mojave fish-hook cactus has been reported in the following California counties; Inyo, Kern, and San Bernardino (CNPS 2011). The nearest known location is 25 mi north of the Project area in Red Rock Canyon (CCH 2011).

Although suitable habitat for this species is present in the Project area within Creosote Bush Scrub and Joshua Tree Woodland, the species was not observed during botanical surveys conducted by GANDA during the flowering period (April to July). No species of *Sclerocactus* were observed during the surveys.

Piute Mountains jewel-flower (*Streptanthus cordatus* var. *piutensis*)

Piute Mountains jewel-flower is a 6 inch to 2.5 foot tall perennial herbaceous plant in the Mustard family (Brassicaceae) with clusters of thick obovate basal leaves, and clasping lanceolate upper leaves with few to many stalks of ½ inch long purple flowers that can have green or yellow sepals or outer petals (Hickman, 1993). Piute Mountains jewel-flower is known to occur in Broadleafed Upland Forests, Closed-Cone Coniferous Forest, and Pinyon and Juniper Woodland plant community types along roadbanks, cliffs, rock outcrops, and sometimes on metamorphic-red clay soils. Known occurrences range in elevation from 1,000 to 6,500 feet (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 1B.2, indicating that it is rare, threatened or endangered in California and elsewhere, and fairly endangered in California.

Piute Mountains jewel-flower is endemic to California and has only been reported in Kern County. The nearest known location is 7 mi northwest of the Project area on Sweetwater Ridge southeast of Cache Peak (CNDDB 2011).

Only marginally suitable habitat for this species is present in the Project area, and the species was not observed during botanical surveys conducted by GANDA during the flowering period (May to July). No species of *Streptanthus* were observed during the surveys.

Golden violet (*Viola purpurea* ssp. *aurea*)

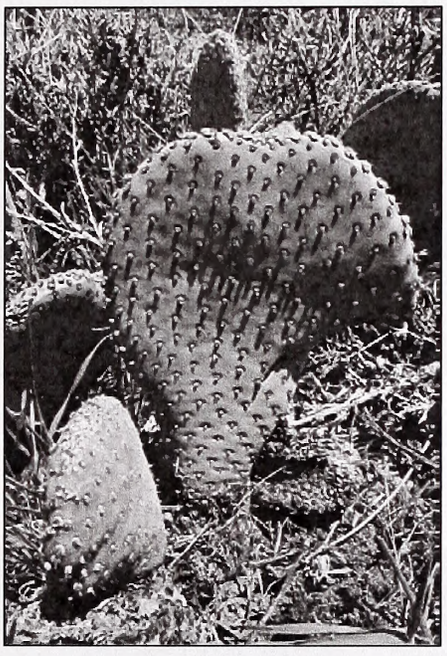
Golden violet is a perennial herb in the Violet family (Violaceae) with golden yellow flowers. It is typically found on sandy substrates in Great Basin Scrub and Pinyon and Juniper Woodland habitats. Known occurrences range in elevation from 3,200 to 6,700 feet (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 2.2, indicating that it is rare, threatened or endangered in California, but more common elsewhere.

In California, golden violet is known is known to occur in Kern, Lassen, Los Angeles, Mono, San Bernardino, San Diego, and Sierra counties. This species is also known to occur in Nevada (CNPS 2011). There are only two CNDDB occurrence records for this species in Kern County, an older record from "Mojave Station", and another from the Temblor Range on the western side of the San Joaquin Valley, more than 70 miles from the Project area.

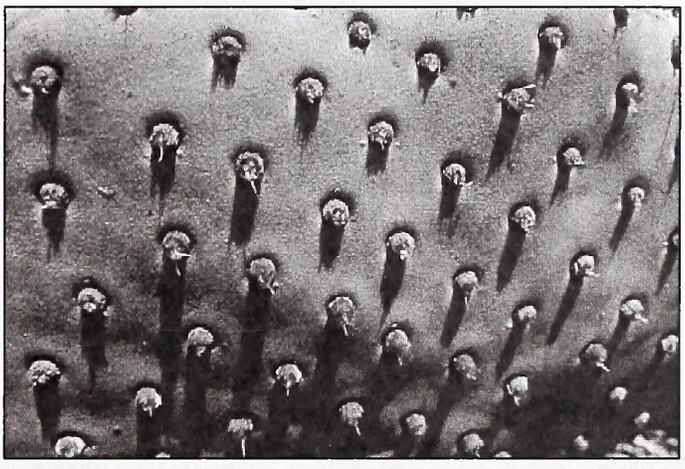
No suitable habitat for this species is present in the Project area, and the species was not observed during botanical surveys conducted during the flowering period of April to June.

Appendix F

Representative photographs



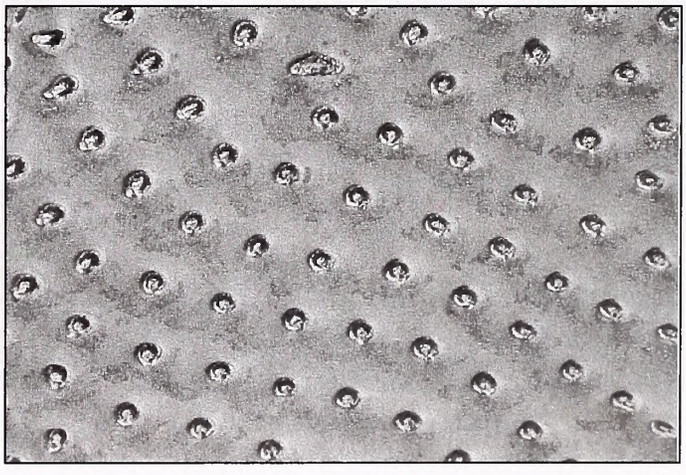
Bakersfield cactus



Bakersfield cactus



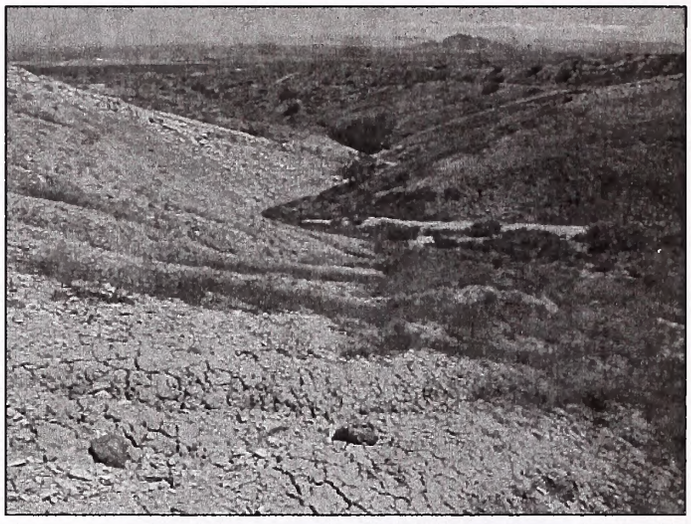
Beavertail cactus



Beavertail cactus



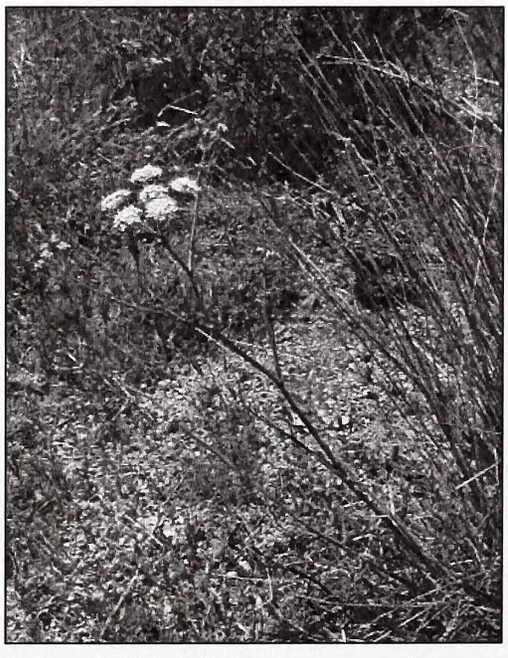
Pale-yellow layia



Pale-yellow layia habitat



Pale-yellow layia habitat



Adobe yampah

Appendix D-27

Botanical Inventory Report June 2011

Alta East Wind Energy Project
2011
Botanical Survey Report

Prepared for:
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June 2011

GANDA

Executive Summary

Botanical surveys for the approximately 917-acre survey area for the Alta East Wind Energy Project were conducted by Garcia and Associates (GANDA) from April 18-20, May 9-13, and 16, 2011. A second round of late-season surveys of habitats determined to be potentially suitable for later-blooming species was conducted from June 21-22, 2011. The purpose of the surveys was to locate and map special-status plant species, species afforded protection under the California Desert Native Plants Act (CDNPA), "large" Joshua trees (CH2M Hill 2010a), and invasive plant species. The transect-based botanical surveys followed the guidelines of the California Department of Fish and Game (CDFG 2009a), the U.S. Fish and Wildlife Service (USFWS 1996a), and the California Native Plant Society (CNPS 2001).

Pre-field research was conducted to select special-status with potential to be found within the Project site. The list of potentially occurring special-status plants was derived from several sources, including U.S. Geological Survey 7.5' quadrangle-based searches of the California Natural Diversity Database (CNDDB 2011a), the CNPS on-line Inventory (2011), and other sources. Fifty-six special-status were determined to have potential to occur within the Project site based on habitat preferences and known distribution.

Three special-status species were observed within the Project site: The Federal and State endangered Bakersfield cactus (*Opuntia basilaris* var. *treleasei*), pale-yellow layia (*Layia heterotricha*: CNPS List 1B.1), and adobe yampah (*Perideridia pringlei*: CNPS List 4.3). A total of 112 individuals of Bakersfield cactus were mapped within the Project survey area. Three sites, each with a single plant were recorded for pale-yellow layia. Based on the lower than average seasonal rainfall totals in the vicinity of the Project, and observations of the low germination rates in other annual species in the area, it is likely that germination for pale-yellow layia was poor in 2011 and that larger populations occur in the area in favorable years. Areas of suitable clay soil habitat for pale-yellow layia were mapped in the vicinity of the observed individuals. Two adobe yampah plants in two separate locations were observed.

Inventoried and mapped species afforded protection under the CDNPA included 373 silver cholla (*Opuntia echinocarpa*), 728 beavertail cactus (*O. b.* var. *basilaris*), 112 Bakersfield cactus, and 1,433 chaparral yucca (*Yucca whipplei*).

A total of 1,135 Joshua trees (*Yucca brevifolia*) meeting the minimum size criteria for "large" trees were mapped during the surveys.

Ten species of invasive plant species were observed onsite. Infestations of six of these species were mapped and population numbers were estimated. The remaining four species are widespread and common throughout the Project area and were therefore not mapped.

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Appendix A. Vascular Plant Species Observed in the Project area.
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Appendix F. Representative photographs.

1.0 Introduction

Garcia and Associates, as a subcontractor to CH2M Hill Engineers, Inc. (CH2M HILL), was tasked with conducting botanical surveys for the Alta East Wind Energy Project (Project). The purpose of the botanical surveys was to locate and map occurrences of special-status and invasive plant species occurring within the proposed Alta East Wind Energy Project area. GANDA was not tasked with mapping or describing the vegetation communities occurring on the Project, as these have been reported previously (CH2M Hill 2010b).

1.1 Project description

Alta Windpower Development, LLC, proposes to develop the Alta East Wind Energy Project in southeastern Kern County, California. The Project area is located within the Tehachapi Wind Resource Area, a region recognized by the U.S. Department of Energy as having high wind energy resources. The Project will be located on Bureau of Land Management and private land. At full build-out, the Project is expected to produce an overall net generating capacity of up to 318 megawatts using up to 106 wind turbine generators. Associated supporting infrastructure including access roads, generator tie-in circuits, and transmission lines would also be constructed.

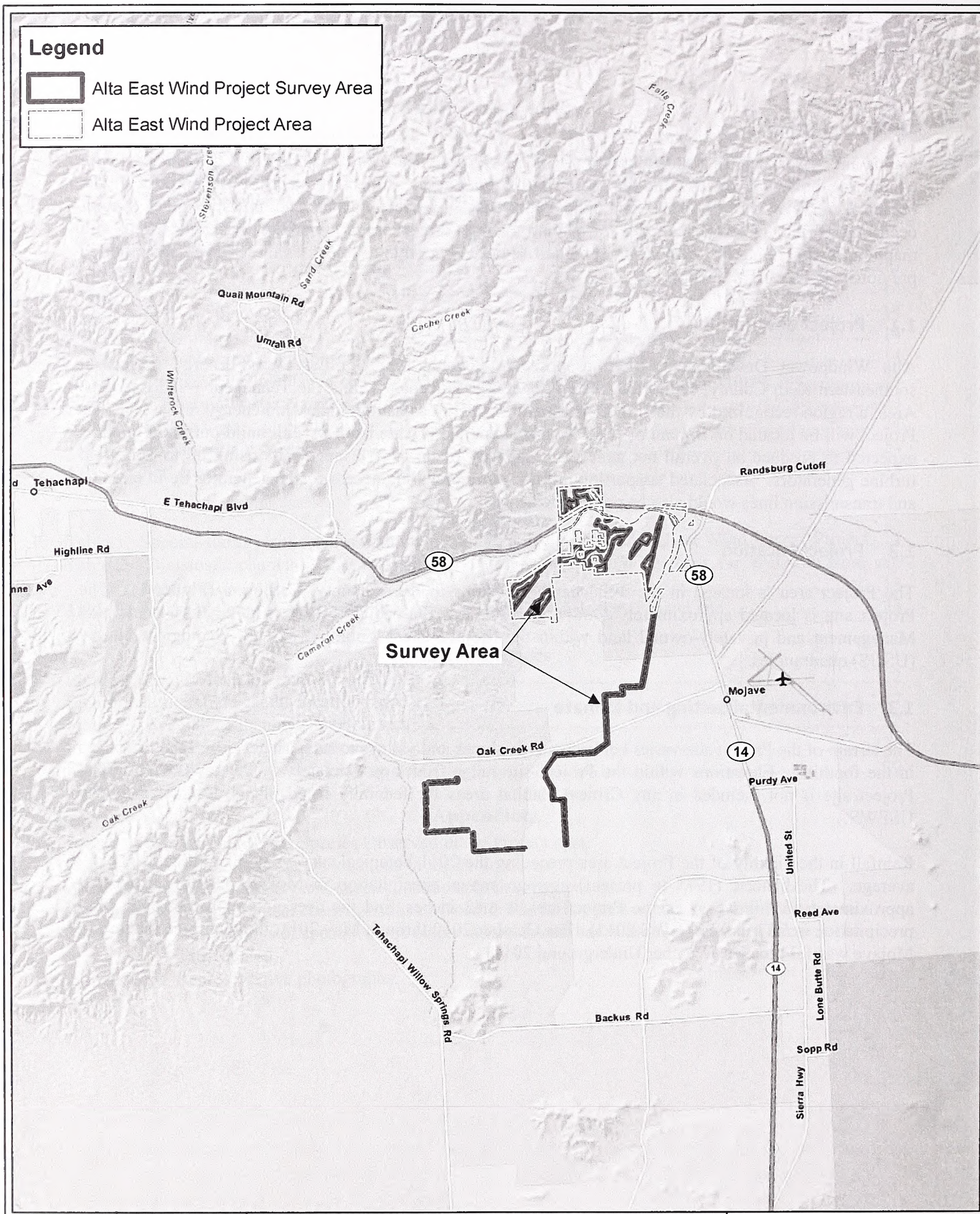
1.2 Project Location

The Project area is located in the Tehachapi Mountains in Kern County, California (Figure 1). The Project site is located approximately 4 miles northwest of the Mojave, California, on Bureau of Land Management and privately-owned land within the Mojave and Monolith 7.5' U.S. Geological Survey (USGS) quadrangles.

1.3 Environmental Setting and Climate

The terrain of the Project site varies between gentle slopes and valleys to steep ridges, hills, and drainages in the foothills. Elevations within the Project site range from approximately 3,000 to 3,900 feet. The Project site is not included in any Critical Habitat areas for federally listed plants designated by the USFWS.

Rainfall in the vicinity of the Project area preceding the 2011 botanical surveys was significantly below average. The historic (1971 to present) average annual precipitation in Mojave, California, located approximately 6 miles west of the Project area is 6.63 inches, and the average October through May precipitation is 5.87 inches. (NWS 2011). For October 2010 through May 2011, the total precipitation in Mojave was 1.34 inches (Weather Underground 2011).



GANDA

Project Location

Source: ESRI, World Street Map, GANDA GIS 2011

Kilometers
0 4
Miles
0 4

Figure 1. Project location map.

Alta East Wind Project

Kern County, CA

June 2011

2.0 Methods

2.1 Special-status plants

2.1.1 Pre-field research and literature review

Prior to conducting the botanical surveys research was conducted to identify special-status plant species with potential to occur on the Project site. For each potentially occurring species, information was compiled on conservation status, distribution, habitat characteristics, flowering time, presence in the Project region, and characteristics used in field identification.

A plant was considered to be of special status if it met one or more of the following criteria:

- Federally or state-listed, proposed, or candidate for listing, as rare, threatened or endangered (USFWS 1996b, 2006, 2011; CNDDB 2011a, CNPS 2011); or
- Special Plant as defined by the CDFG CNDDB (CDFG 2011b); or
- Designated by the California Native Plant Society (CNPS) in its *Inventory of Rare and Endangered Plants of California* (CNPS 2011)

A species was determined to have potential to occur within the Project area if its known or expected geographic range includes the Project area or the vicinity of the Project area, and if its known or expected habitat is found within or near the Project area. For this project, the Project area vicinity includes the western Mojave Desert, Tehachapi Mountains, and southern Sierra Nevada.

A preliminary list of potentially occurring special-status plants was derived from several sources. Quadrangle-based searches of the CNPS Inventory (2011) and the CNDDB RareFind3 database (2011a) were used to identify potentially occurring special-status plants. The 7.5' USGS quadrangles containing the Project area (Mojave and Monolith), and six additional surrounding USGS 7.5' quadrangles (Sanborn, Soledad Mtn, Willow Springs, Tehachapi NE, Cache Peak, and Mojave NE) were included in the searches. A search of the CNPS database for List 1-3 taxa in these quadrangles returned 15 taxa. Four additional taxa were added to this list, based on recent observations at nearby project sites, for a total of 19. The CNDDB database search failed to return any additional CNPS List 1-3 taxa. CNPS List 4 species with the potential to occur in the vicinity of the Project were identified by searching the CNPS Inventory for all of Kern County. Seventy-one taxa were identified in this search. The combined List 4 and List 1-3 searches returned a total of 90 taxa, but only 45 of these were retained for potential occurrence in the project area. The others were excluded from consideration, because they either occurred well outside of the known distribution of the taxon, occurred in habitats not represented in the project area, occurred well outside of the known elevational range of the species, or were specific to soil types not believed to occur in the project areas.

Table 1 summarizes information on the 45 special-status plants determined to have the potential to occur on the Project site. The table includes information on flowering time, conservation status, habitat preferences, geographic distribution, elevation, and known locations in the vicinity of the Project area.

Table 1. Special-status plant species with the potential to occur on the Alta East Wind Energy Project.

Taxon	Status Fed/State/BLM/CNPS	Flowering period	Habitat and elevation	Potential for occurrence in the Project area
Allium atrorubens var. *cristatum* Inyo onion	--/--/--/4.3	Apr-Jun	Joshua Tree Woodland, Pinyon-Juniper Woodland - sandy or rocky sites. 3,940 - 8,400 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 42 mi northeast of the Project area in the Owens Peak watershed (CCH 2011).
Allium shevockii Spanish needle onion	--/--/SS/1B.3	May-Jun	Pinyon-Juniper Woodland, Upper Montane Coniferous Forest - in soil pockets on rock outcrops and talus slopes; bulbs mostly on margins of outcrops. 2,790 - 8,200 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 8 mi west of the Project area near upper Horse Canyon about 4 miles upstream from Sand Canyon (CNDDB 2011a).
Androsace elongata ssp. *acuta* California androsace	--/--/--/4.2	Mar-Jun	Chaparral, Cismontane Woodland, Coastal Sage Scrub, Valley and Foothill Grassland - highly localized and often overlooked little plant. 490 - 3,940 ft.	**Unlikely.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 20 mi west of the Project area in the Tehachapi Mountains near Keene Station (CCH 2011).
Astragalus hornii var. *hornii* Horn's milk-vetch	--/--/SS/1B.1	May-Oct	Meadows and Seeps, Playas - lake margins, alkaline sites. 200 - 2,790 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 15 mi south of the Project area in Willow Springs. (CNDDB 2011a).
Calochortus striatus alkali mariposa lily	--/--/SS/1B.2	Apr-Jun	Chaparral, Chenopod Scrub, Mojavean Desert Scrub, Meadows - alkaline meadows and ephemeral washes. 230 - 5,230 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 12 mi south of the Project area along Sierra Highway between Sopp Road and Backus Road (CNDDB 2011a).
Camissonia kernensis ssp. *kernensis* Kern County evening-primrose	--/--/--/4.3	Mar-May	Joshua Tree Woodland, Pinyon and Juniper Woodland - sandy or gravelly granitic soils. 2,590 - 6,990 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 4 mi south of the Project area about 3 miles west of Hwy 14 on Oak Creek Drive (CCH 2011).
Canbya candida white pygmy-poppy	--/--/--/4.2	Mar-Jun	Joshua Tree Woodland, Mojavean Desert Scrub - sandy places. 1,970 - 4,790 ft.	**Unlikely.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 4 mi east of the Project area 2 miles north of Mojave. (CNDDB 2011a).
Castilleja plagiotoma Mojave paintbrush	--/--/--/4.3	Apr-Jun	Great Basin Scrub, Pinyon-Juniper Woodland - alluvial fans. 980 - 8,200 ft.	**Unlikely.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 6 mi west of the Project area near the intersection of Sand Canyon and Tranquility Roads (CCH 2011).

Taxon	Status Fed/State/BLM/CNPS	Flowering period	Habitat and elevation	Potential for occurrence in the Project area
Chamaesyce vallis-mortae Death Valley sandmat	--/--/--/4.2	May-Oct	Mojavean Desert Scrub - sandy or gravelly sites. 750 - 4,790 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. Possibly North Sky Records (GANDA 2010)
Chorizanthe spinosa Mojave spineflower	--/--/--/4.2	Mar-Jul	Chenopod Scrub, Mojavean Desert Scrub. 20 - 4,270 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 5 mi southeast of the Project area in Mohave (CCH 2011).
Clarkia xantiana ssp. *parviflora* Kern Canyon clarkia	--/--/--/4.2	May-Jun	Cismontane Woodland, Great Basin Scrub - dry slopes. 2,300 - 11,880 ft.	**Unlikely.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 26 mi northwest of the Project area about 2 mi west of Kelso Valley Road, off of road to Piute Mountain (CNDDB 2011a).
Cordylanthus rigidus ssp. *brevibracteatus* short-bracted bird's-beak	--/--/--/4.3	Jul-Aug	Chaparral, Lower Montane Coniferous Forest, Pinyon-Juniper Woodland, Upper Montane Coniferous Forest - in openings, on granitic soil. 3,280 - 8,500 ft.	**Unlikely.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 12 mi west of the Project area in Antelope Canyon south of Tehachapi (CCH 2011).
Deinandra mohavensis Mojave tarplant	--/SE/SS/1B.3	Jun-Oct(Jan),	Riparian Scrub, Chaparral - low sand bars in river bed; mostly in riparian areas or in ephemeral grassy areas. 2,110 - 5,280 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is about 14 miles northwest of the Project area near Cutterbank Springs (CNDDB 2011a).
Delphinium gypsophilum ssp. *gypsophilum* gypsum-loving larkspur	--/--/--/4.2	Feb-May	Chenopod Scrub, Valley and Foothill Grassland, Cismontane Woodland - on open slopes and in fields. 330 - 3,260 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 3 mi west of the Project area on the north slope of Tehachapi Pass (CCH 2011).
Delphinium parryi ssp. *purpureum* Mt. Pinos larkspur	--/--/--/4.3	May-Jun	Pinyon-Juniper Woodland, Mojavean Desert Scrub, Chaparral. 3,280 - 8,530 ft.	**Unlikely.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 12 mi north of the Project area near Emerald Mountain (CNDDB 2011a).
Dudleya abramsii ssp. *calcicola* limestone dudleya	--/--/--/4.3	Apr-Aug	Chaparral, Pinyon-Juniper Woodland - rocky places on limestone. 1,640 - 8,530 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 17 mi northwest of the Project area about 3 km north of Twin Oaks in the southern Piute Mtns (CCH 2011).

Taxon	Status Fed/State/BLM/CNPS	Flowering period	Habitat and elevation	Potential for occurrence in the Project area
Eriastrum hooveri Hoover's eriastrum	DL/--/--/4.2	Mar-Jul	Chenopod Scrub, Valley and Foothill Grassland, Pinyon and Juniper Woodland - on sparsely vegetated alkaline alluvial fans; also in the Temblor Range on sandy soils. 160 - 3,000 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 22 mi south of the Project area on the southwest edge of Rosamond Dry Lake (CCH 2011).
Eriastrum tracyi Tracy's eriastrum	--/SR/SS/1B.2	Jun-Jul	Chaparral, Cismontane Woodland - gravelly shale or clay; often in open areas. 1,040 - 3,700 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 12 mi north of the Project area about 1.5 miles northeast of Emerald Mountain (CNDDB 2011a).
Ericameria albida white-flowered rabbitbrush	--/--/--/4.2	Jun-Nov	Chenopod Scrub, Meadows and Seeps, saline or Alkaline Playas. 980 - 6,400 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 50 mi northeast of the Project area in Indian Wells Valley (CCH 2011).
Eriogonum kennedyi var. *pinicola* Kern buckwheat	--/--/SS/1B.1	May-Jun(Jul),	Chaparral, Pinyon and Juniper Woodland - open places on clay soil. 4,400 - 6,400 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 4 mi northeast of the Project area on a ridge south of Pine Tree Canyon (CNDDB 2011a).
Eriophyllum mohavense Barstow woolly sunflower	--/--/SS/1B.2	(Mar),Apr-May	Desert Chenopod Scrub, Mojavean Desert Scrub, Desert Playas - mostly in open, silty or sandy areas w/saltbush scrub, or creosote bush scrub, barren ridges or margins of playas. 1,640 - 3,150 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is Edwards Air Force Base 20 mi E of the project area (CNDDB 2011a)
Gilia interior inland gilia	--/--/--/4.3	Mar-May	Cismontane Woodland, Joshua Tree Woodland, Lower Montane Coniferous Forest - rocky sites. 2,300 - 5,580 ft.	**Unlikely.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 23 mi south of the Project area west of Lancaster at 125th St. & Calif. Hwy 138 (CCH 2011).
Gilia latiflora ssp. *cuyamensis* Cuyama gilia	--/--/--/4.3	Apr-Jun	Pinyon and Juniper Woodland - sandy flats, lower river valleys. 1,970 - 6,560 ft.	**Unlikely.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 33 mi south of the Project area in the vicinity of Ritter Ridge on the south side of the Antelope Valley (CCH 2011).
Goodmania luteola golden goodmania	--/--/--/4.2	Apr-Aug	Meadows, Mojavean Desert Scrub, Playas, Valley and Foothill Grassland - in the central valley from Madera County to Kern County. 70 - 7,220 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 21 mi east of the Project area 8 mi north of Muroc (CCH 2011).

Taxon	Status Fed/State/BLM/CNPS	Flowering period	Habitat and elevation	Potential for occurrence in the Project area
Lasthenia glabrata ssp. *coulteri* Coulter's goldfields	--/--/SS/1B.1	Feb-Jun	Coastal Salt Marshes, Playas, Valley and Foothill Grassland, Vernal Pools - usually found on alkaline soils in playas, sinks, and grasslands. 0 - 4,000 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 12 mi west of the Project area in Tehachapi (CNDDB 2011a).
Layia heterotricha pale-yellow layia	--/--/SS/1B.1	Mar-Jun	Cismontane Woodland, Pinyon-Juniper Woodland, Valley and Foothill Grassland - alkaline or clay soils; open areas. 980 - 5,590 ft.	**Present.** Three individuals were mapped at three separate locations within the 2011 survey area. Additional suitable habitat is present.
Loeflingia squarrosa var. *artemisiarum* sagebrush loeflingia	--/--/--/2.2	Apr-May	Great Basin Scrub, Sonoran Desert Scrub, Desert Dunes - sandy flats and dunes. Sandy areas around clay slicks w/*Sarcobatus*, *Atriplex*, *Tetradymia*, etc. 2,300 - 5,300 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 10 mi southeast of the Project area northeast of Acton (CNDDB 2011a).
Mentzelia eremophila solitary blazing star	--/--/--/4.2	Mar-May	Mojavean Desert Scrub. 2,300 - 4,000 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 9 mi north of the Project area on the east side of Barren Ridge, about 7.5 mi northwest of California City (CCH 2011).
Microseris sylvatica sylvan microseris	--/--/--/4.2	Mar-Jun	Chaparral, Cismontane Woodland, Great Basin Scrub, Pinyon-Juniper Woodland, Valley and Foothill Grassland - sometimes on serpentine. 150 - 4,920 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 12 mi west of the Project area in Tehachapi (CCH 2011).
Mimulus pictus calico monkeyflower	--/--/SS/1B.2	Mar-May	Broadleafed Upland Forest, Cismontane Woodland - in bare ground around gooseberry bushes or around granite rock outcrops. 330 - 4,270 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 6 mi northwest of the Project area near a tributary to Cache Creek/Sand Canyon, northeast of Monolith (CNDDB 2011a).
Monardella linoides ssp. *oblonga* Tehachapi monardella	--/--/SS/1B.3	Jun-Aug	Lower Montane Coniferous Forest, Upper Montane Coniferous Forest, Pinyon-Juniper Woodland - on dry slopes of yellow pine forest, decomposed granitic soils; also in roadside disturbed areas. 2,960 - 8,130 ft.	**Absent.** The species was not observed in surveys conducted outside of the flowering period, but the species is a perennial and would have been detected. No suitable habitat is present. The nearest known location is 8 mi north of the Project area about 0.8 mi SE of Cache Peak (CCH 2011).

Taxon	Status Fed/State/BLM/CNPS	Flowering period	Habitat and elevation	Potential for occurrence in the Project area
Muilla coronata crowned muilla	--/--/--/4.2	Mar-Apr(May),	Joshua Tree Woodland, Pinyon-Juniper Woodland, Mojavean Desert Scrub - mostly on barren flats and ridges in sandy, granitic soils. 2,510 - 6,430 ft.	**Unlikely.** The species was not observed in surveys conducted during the fruiting period. The nearest known location is 7 mi west of the Project area off of Oak Creek Rd., 8.9 mi west of Mojave (CCH 2011).
Navarretia setiloba Piute Mountains navarretia	--/--/SS/1B.1	Apr-Jul	Cismontane Woodland, Pinyon-Juniper Woodland, Valley and Foothill Grassland - red clay soils, other clay soils (?), or on gravelly loam. 1,000 - 6,890 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 24 mi northwest of the Project area on Piute Mountain Road, <3 miles from the Caliente Bodfish Road (CNDDB 2011a).
Nemacladus gracilis slender nemacladus	--/--/--/4.3	Mar-May	Cismontane Woodland, Valley and Foothill Grassland - sandy or gravelly places. 390 - 6,230 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 9 mi west of the Project area in Oak Creek Canyon, 1.8 miles southwest of intersection of Oak Creek Rd and Tehachapi Willow Springs Rd (CCH 2011).
Nemacladus secundiflorus var. *secundiflorus* large-flowered nemacladus	--/--/--/4.3	Apr-Jun	Chaparral, Valley and Foothill Grassland - dry, sandy to gravelly flats and slopes. 660 - 6,560 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 45 mi north of the Project area on Greenhorn Mountain (CCH 2011).
Opuntia basilaris var. *treleasei* Bakersfield cactus	FE/SE/SS/1B.1	Apr-May	Chenopod Scrub, Valley and Foothill Grassland, Cismontane Woodland - coarse or cobbly well-drained granitic sand on bluffs, low hills, and flats within grassland. 400 - 3,760 ft.	**Present.** 112 individual plants were mapped within the 2011 botanical survey area.
Pentachaeta fragilis fragile pentachaeta	--/--/--/4.3	Mar-Jun	Chaparral, Lower Montane Coniferous Forest - sandy soils. 150 - 6,890 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 17 mi north of the Project area in Kelso Valley (CCH 2011).
Perideridia pringlei adobe yampah	--/--/--/4.3	Apr-Jun(Jul),	Chaparral, Cismontane Woodland, Pinyon and Juniper Woodland, Coastal Scrub - serpentine grassland hillsides, clay soils, seasonally wet sites. 980 - 5,910 ft.	**Present.** Two individuals were mapped in two separate locations within the 2011 botanical survey area.
Phacelia cicutaria var. *hubbyi* Hubby's phacelia	--/--/--/4.2	Apr-Jun	Chaparral, Coastal Scrub, Valley and Foothill Grassland - gravelly, rocky areas and talus slopes. 0 - 3,280 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 17 mi north of the Project area near Jawbone area (CCH 2011).

Taxon	Status Fed/State/BLM/CNPS	Flowering period	Habitat and elevation	Potential for occurrence in the Project area
Phacelia exilis Transverse Range phacelia	--/--/--/4.3	May-Aug	Meadows, Lower Montane Coniferous Forest, Upper Montane Coniferous Forest - sandy or rocky slopes, flats, meadows. 3,610 - 8,860 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 24 mi northwest of the Project area to the southeast of Piute Peak (CCH 2011).
Phacelia nashiana Charlotte's phacelia	--/--/SS/1B.2	Mar-Jun	Joshua Tree Woodland, Mojavean Desert Scrub, Pinyon-Juniper Woodland - granitic soils; sandy or rocky areas on steep slopes or flats. 1,970 - 7,220 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 9 mi northeast of the Project area on an east slope of Barren Ridge, about 4.5 miles southwest of the mouth of Pine Tree Canyon (CNDDB 2011a).
Psorothamnus arborescens var. *arborescens* Mojave indigo-bush	--/--/--/4.3	Apr-May	Riparian Scrub - desert hillsides and stony flats on granitic bedrock. 1,310 - 3,890 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 24 mi north of the Project area in Red Rock Canyon (CCH 2011).
Sclerocactus polyancistrus Mojave fish-hook cactus	--/--/--/4.2	Apr-Jul	Joshua Tree Woodland, Mojavean Desert Scrub - well-drained soil, on rocky gravelly mesas, slopes & outcrops; sometimes on limestone. 2,100 - 7,610 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 25 mi north of the Project area in Red Rock Canyon (CCH 2011).
Streptanthus cordatus var. *piutensis* Piute Mountains jewel-flower	--/--/SS/1B.2	May-Jul	Broadleafed Upland Forests, Closed-Cone Coniferous Forest, Pinyon-Juniper Woodland - along roadbanks and cliffs, metamorphic-red clay soils. 3,590 - 5,990 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. No suitable habitat is present. The nearest known location is 7 mi northwest of the Project area on Sweetwater Ridge southeast of Cache Peak (CNDDB 2011a).
Viola purpurea ssp. *aurea* golden violet	--/--/SS/2.2	Apr-Jun	Great Basin Scrub, Pinyon-Juniper Woodland - dry, sandy slopes. 3,280 - 6,690 ft.	**Absent.** The species was not observed in surveys conducted during the flowering period. The nearest known location is 5 mi south of the Project area near Mojave Station (CNDDB 2011a), but the plants at this location were misidentified (John Little pers. com.)

Sources:
Bureau of land Management 2010; California Native Plant Society. 2010; California Natural Diversity Database. 2010;Jepson Online Interchange. 2010; Consortium of California Herbaria 2010.

[1] **Conservation status abbreviations:**

U.S. Fish and Wildlife Service designations:

FE Endangered: Any species in danger of extinction throughout all or a significant portion of its range.
FT Threatened: Any species likely to become endangered within the foreseeable future.

California Department of Fish and Game designations:

SE Endangered: Any species in danger of extinction throughout all or a significant portion of its range.
ST Threatened: Any species likely to become endangered within the foreseeable future.
SR Rare: Any species not currently threatened with extinction, but in such small numbers throughout its range that it may become endangered if its present environment worsens.

Bureau of Land Management designations:

SS Special-Status
PI Plant of Interest

California Native Plant Society designations:

1B Plants rare, threatened or endangered in California and elsewhere.
2 Plants rare, threatened or endangered in California, but more common elsewhere.
3 Plants for which more information is needed – a review list.
4 Plants of limited distribution – a watch list.

California Native Plant Society threat categories:

.1 Seriously endangered in California.
.2 Fairly endangered in California.
.3 Not very endangered in California.

[2] **Occurrence potential definitions:**

Present: Species observed on the site.
Likely: Species not observed on the site, but reasonably certain to occur on the site.
Possible: Species not observed on the site, but conditions suitable for occurrence.
Unlikely: Species not observed on the site, conditions marginal for occurrence.
Absent: Species or suitable habitat not observed on the site during protocol-level surveys.

2.1.2 Reference site visits

Reference site visits were conducted for eight species of special-status plants with potential to occur at the Project site:

Alkali Mariposa lily (*Calochortus striatus*): Several hundred plants were observed in flowering condition in Alkali Sink habitat at the intersection of Avenue E and 60th St. north of Lancaster on May 13, 2011.

Pygmy poppy (*Canbya candida*): On May 2, 2011 plants were searched for in sandy soils within Blackbrush Scrub habitat at a location near Kelso Valley where the species was observed in 2010. No pygmy poppies were found in 2011.

Death Valley sandmat (*Chamaesyce vallis-mortae*): On May 2, 2011, about a dozen plants were observed in vegetative and early flowering conduction at a site near the Kelso Valley where the species was observed in 2010.

Mojave spineflower (*Chorizanthe spinosa*): Several hundred plants were observed in flowering condition in Alkali Sink habitat at the intersection of Avenue E and 60th St. north of Lancaster on May 13, 2011.

Mojave tarplant (*Deinandra mohavensis*): On June 7, 2011, several hundred individuals were observed in vegetative condition at a reference population near Kelso Valley.

Tracy's eriastrum (*Eriastrum tracyi*): On June 8, 2011, several thousand individuals were observed in flowering condition at a reference population near Kelso Valley.

Golden goodmania (*Goodmania luteola*): About 20 plants were observed in early flowering condition in Alkali Sink habitat at the intersection of Avenue G and 30th St., north of Lancaster on May 6, 2011.

Bakersfield cactus: On April 25, 2011, the extensive population at the Sand Ridge Preserve (CNDDB Occurrence No. 3) was visited to compare spine characteristics at a known population of Bakersfield cactus with the spine-bearing individuals located on the project site.

2.1.3 Protocol-level surveys

Transect-based protocol-level botanical surveys following the guidelines of the California Department of Fish and Game (CDFG 2009a), the USFWS (1996a), and the CNPS (2001) were conducted from April 18-20, May 9-13, and 16, 2011. A second round of late-season surveys of habitats determined to be potentially suitable for later-blooming species was conducted from June 21-22, 2011. The goal of the surveys was to census, map, photograph and record habitat data for every special-status plant location that was detected. Surveys were floristic in scope, meaning that all plants found in identifiable condition were identified to the taxonomic level necessary to determine their rarity or listing status.

Global positioning systems (GPS) units were used to map special-status plant species, species protected under the California Desert Native Plants Protection Act (CDNPA), and invasive weed populations. Trimble® GeoXT GPS units with sub-meter accuracy were used to map all locations of special-status plants, and some of the weed and CDNPA locations. The remaining invasive weed and CDNPA species locations were mapped with Garmin GPS units with ~3m accuracy. The Trimble GPS units were equipped with data files for navigation and with data dictionaries for data collection. Data dictionaries and field data forms were used to record locality information, the actual or estimated number of individuals observed, and habitat information.

A list of all plant species observed was compiled for the Project site (Appendix A) during the surveys. Nomenclature for scientific names follows *The Jepson Manual* (Hickman 1993), except where noted.

The ability of surveyors to detect and identify plants rapidly and accurately in the field was enhanced by a field review of the common plant species at the Project site prior to beginning the surveys. All surveyors were provided with photo guides of targeted special-status plants and preliminary species lists compiled prior to the field surveys.

2.1.4 Bakersfield cactus mapping and identification

There is currently some scientific disagreement about the proper taxonomic characteristics that should be applied to identify the Federal and State endangered Bakersfield cactus (*Opuntia basilaris* var. *treleasei*), as opposed to the closely related variety, beavertail cactus (*O. b.* var. *basilaris*). Using identification criteria offered recently by CDFG, the listed species is very common on the project. However, using the keys and descriptions published in standard floras such as The Jepson Manual (Hickman, 1993), A California Flora (Munz and Keck 1973), and Flora of North America (FNA 1993), there are few, if any, individuals of the listed species on site. The CDFG has recently requested that varietal identification of *Opuntia basilaris* plants occurring in Kern County should use a recently-issued CDFG guidance document (Cypher 2011) that bases the taxonomic interpretation of the varieties largely on outdated or unpublished literature (e.g. Coulter 1896; Griffiths and Hare 1906; Britton and Rose 1920, and Bowen 1987). The diagnostic characteristics of Bakersfield cactus listed in the guidance document are reproduced in Table 2 below. Under this recently-issued guidance, plants possessing any one of the diagnostic characters listed in the table are to be considered "Bakersfield cactus." This approach has not yet been shown to accurately identify Bakersfield cactus; however, GANDA has used it to identify individuals of the listed variety for purposes of this report. GANDA recommends re-evaluating the identification of plants on the Project site as Bakersfield cactus using the standard criteria described in The Jepson Manual (Hickman, 1993), A California Flora (Munz and Keck 1973), and Flora of North America (FNA 1993).

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Table 2. Diagnostic characters that may help to differentiate *Opuntia basilaris* var. *treleasei* from var. *basilaris* [3] (reproduced from Cypher 2011).

Character	var. *basilaris*	var. *treleasei*	Inconclusive
Areole (eye-spot) position	depressed (sunken)	flush with surface or elevated	both depressed and flush on one plant
Number of areoles "across midstem segment" [4]	N/A[5]	<8 per diagonal row	8 or more per diagonal row or variable on one plant
Spines on pads	N/A	>6 mm long 2 or more in some areoles	no or few spines per pad, spines shorter than bristles (therefore not visible)
Ovary or fruit spines	none	3-10 rigid spines per upper areole or apical rim of spines	1-2 spines in upper areoles, weak spines, or both spiny and spineless fruits on one plant
Leaf length[6]	2 mm	5 mm	3-4 mm or absent
Pubescence on pads and fruits	pubescent (with downy hairs)	N/A	glabrous (hairless)
Chromosome number[7]	N/A	2n = 33	2n = 22

[3] Plants possessing even a single diagnostic characteristic of *Opuntia basilaris* var. *treleasei* should be considered to represent the endangered species for the purposes of project permitting and compliance with the California Endangered Species Act (CESA) and the California Environmental Quality Act (CEQA).

[4] Midstem segments are between the basal and terminal pads. Thus, this character is useful only for cactus plants that are three or more pads tall.

[5] Not applicable because the typical character state overlaps between var. *basilaris* and var. *treleasei*.

[6] Leaves are present for only a short time on young growth.

[7] A take permit is necessary to collect the root tips or flower buds needed for chromosome analysis.

During the botanical survey, every *Opuntia basilaris* plant occurring within the Project area was marked with a Trimble® GeoXT GPS unit. The character state for each of the diagnostic morphological characters provided in the CDFG guidance document (Cypher 2011) was recorded for each *Opuntia basilaris* plant directly into data dictionaries on the GPS units. All of the characteristics listed in the table were scored for each plant except for chromosome counts, which require a take permit, pubescence, which is difficult to score, and not diagnostic for the listed variety, and leaf length due to the ephemeral nature of the leaves. Following the surveys, the mapped cacti were assigned an identity based on the recommendations provided by CDFG (2011). Cacti displaying any one, or combination, of the diagnostic characters for var. *treleasei* were considered to be Bakersfield cactus. Cacti lacking any diagnostic characteristics of Bakersfield cactus were considered to be the common beavertail cactus.

2.2 California Desert Native Plants Act

All species afforded protection under the CDNPA were mapped concurrently with the botanical surveys. The CDNPA requires permits for the harvest or removal of certain endemic desert plant species in the Mojave and Sonoran deserts, and prohibits the take of certain species except for scientific or educational purposes. None of the species that are prohibited from take except for scientific or educational purposes are known to occur in the vicinity of the Project.

The CDNPA covers all members of the cactus family (*Cactaceae*), the agave family (*Agavaceae*), the torchwood family (*Burseraceae*), and the ocotillo family (*Fouquieriaceae*). The act also covers ironwood (*Olneya tesota*), mesquite (*Prosopis* spp.), palo verde (*Cercidium* spp.), fan palm (*Washingtonia filifera*), catclaw acacia (*Acacia greggii*), smoketree (*Psorothamnus spinosus*), desert holly (*Atriplex hymenelytra*), crucifixion thorn (*Castela emoryi*), and Panamint dudleya (*Dudleya saxosa*).

2.3 Joshua trees

GANDA was tasked with mapping "large" Joshua trees as defined by the Alta Oak Creek Mojave (AOCM) Joshua Tree Avoidance and Mitigation Plan (CH2M Hill 2010a). "Large" Joshua Trees are defined as trees that "are greater than nine feet tall, more than eight feet wide, and [with] more than seven branchings". During the floristic surveys, the location of each individual Joshua tree or group of trees that met the above criteria was marked with a Garmin or Trimble® GeoXT GPS unit. In some cases, groups of individual trees meeting the minimum size requirements were recorded as a single point and the number of trees per group was recorded.

2.4 Invasive plant species

An invasive plant species is a non-native plant that is included on the invasive plant lists of the California Department of Food and Agriculture (CDFA 2010) or the California Invasive Plant Council (Cal-IPC 2006). Several invasive plant species were widespread and abundant within the Project area and were therefore not mapped. Widespread and abundant invasive plant species observed on the site included cheatgrass (*Bromus tectorum*), red brome (*Bromus madritensis* ssp. *rubens*), Mediterranean grass (*Schismus* sp.) and redstem stork's bill (*Erodium cicutarium*). All other invasive weed species populations were mapped with GPS units. A single GPS point was recorded for each infestation area. Additional GPS points were recorded if the infestation had a visible break or if a significant change in density was observed.

3.0 Results

3.1 Special-status plants observed to occur on the project site

Three special-status plant species were observed within the Project site: the Federal and State Endangered Bakersfield cactus (Figure 2), pale-yellow layia (*Layia heterotricha*: CNPS List 1B.1), and Adobe yampah (*Perideridia pringlei*: CNPS List 4.3). Two adobe yampah plants in two separate locations were observed. Three sites, each with a single plant were recorded for pale-yellow layia, and several additional areas of suitable clay soils for this species were mapped (Figure 3). A total of 112 individual Bakersfield cactus plants were mapped within the Project survey area.

A discussion of each species is presented below. Maps depicting the location of each special-status species occurrence are presented in Figures 2 and 3, and the geographic coordinates of each occurrence are presented in Appendix B and C.

3.1.1 Bakersfield cactus

Bakersfield cactus is a perennial low-growing stem succulent in the Cactus family (Cactaceae) that typically spreads to form extensive thickets. The stems form fleshy, flattened green pads up to 18 cm long by 1 to 1.5 cm thick. The flowers are magenta and usually appear in May (ESRP 2006). Bakersfield cactus is State and Federally endangered and is included on CNPS List 1B.1.

The distribution of Bakersfield cactus has been described in a recent USFWS Recovery Plan (USFWS 1998) as restricted to a limited area of central Kern County near Bakersfield at elevations from approximately 460 to 1,800 feet. Previously, extensive colonies existed around Bakersfield, along the

bluffs of the Kern River, along the Caliente Creek drainage and nearby in the foothills of the western Tehachapi Mountains, and south to the Tejon Hills. Twisselmann (1967) describes a very large population in the Sand Ridge area near Arvin that eventually was protected by The Nature Conservancy within the Sand Ridge Preserve (USFWS 1998). The current distribution of Bakersfield cactus in the Bakersfield area is fragmented and much reduced (ESRP 2006). Specimen records from the Consortium of California Herbaria (2011) include three specimens from the Mojave Desert near the town of Mojave. These specimens are from the 1930s, and the occurrences in this report and others from the greater AOCM project area represent the most recent records of Bakersfield cactus in the Mojave Desert proper. Approximately one-third of the historical occurrences of Bakersfield cactus have been extirpated and the remaining populations are highly fragmented (USFWS 1998, ESRP 2006).

All of the *Opuntia basilaris* plants classified under the CDFG guidelines (2011) as Bakersfield cactus were observed to occur in the hills in the northern portion of the Project area (Figure 2). This is consistent with previous observations of these plants on the greater AOCM Project site, where the frequency of individuals with characteristics of Bakersfield cactus is greater on hilly sites at higher elevations.

3.1.2 Pale-yellow layia

Pale-yellow layia is an annual herb in the Sunflower family that occurs on alkaline or clay soils in Cismontane Woodland, Coastal Scrub, Pinyon and Juniper Woodland, and Valley and Foothill Grasslands (CNPS 2011). Known occurrences range in elevation from 984 to 5,592 feet. It has no State or Federal listing status, but is included on CNPS List 1B.1, indicating that it is rare, threatened or endangered in California and elsewhere, and seriously endangered in California.

In California, pale-yellow layia has been found in Fresno, Kings, Kern, Los Angeles, Monterey, Santa Barbara, San Benito, San Luis Obispo, and Ventura counties (CNPS 2011). The nearest previously known location to the Project area is in the Tomo-Kahni State Historic Park, seven miles north of the Project area (CCH 2011).

Three individual pale-yellow layia plants at three separate locations were observed. One of the individuals was located about 60 ft. outside of the survey boundary, while both of the other occurrences were within the Project boundary. The plants were found in non-native grasslands dominated by cheatgrass and red brome at two sites, and on barren soils at the third. At each location, the plants were associated with greenish-gray cracking clay soils. There are several clay lenses composed of these soils in a band adjacent to and below the prominent white alkaline rock outcrops that are visible on the areal imagery in the northern portion of the Project area (Figure 3). These outcrops are mapped as Torriorthents-rock outcrop complex, very steep by NRCS (2011), but the smaller clay inclusions associated with pale-yellow layia are not mapped, and the name of the clay soils series or horizon that serves as habitat for the species was not determined.

At each mapped site, only a single pale-yellow layia plant was observed, and the plants are likely to be more abundant during favorable years. It is possible that additional populations occur in areas with suitable soils, but were not detected due to the apparent low germination of the species in 2011. Germination for other annuals in the area also seems to have been poor in 2011. For example, thousands of dried desert candle (*Caulanthus coulteri*) remains from 2010 were observed on the same soils as pale-yellow layia, but only about a dozen live desert candle plants were observed in 2011. Areas of clay soils likely to be occupied by pale-yellow layia are depicted in Figure 3.

Pale-yellow layia has been assigned the State's highest rarity rank (list 1B.1), and the populations occurring on the Project site represent the easternmost known locations of the species, which has not been previously documented from the Mojave Desert. Impacts to these populations should be considered

significant under the California Environmental Quality Act. Avoidance of disturbance of these soils is recommended due to the possibility of larger populations of pale-yellow layia in the area during a more favorable rain year. Additional surveys are recommended.

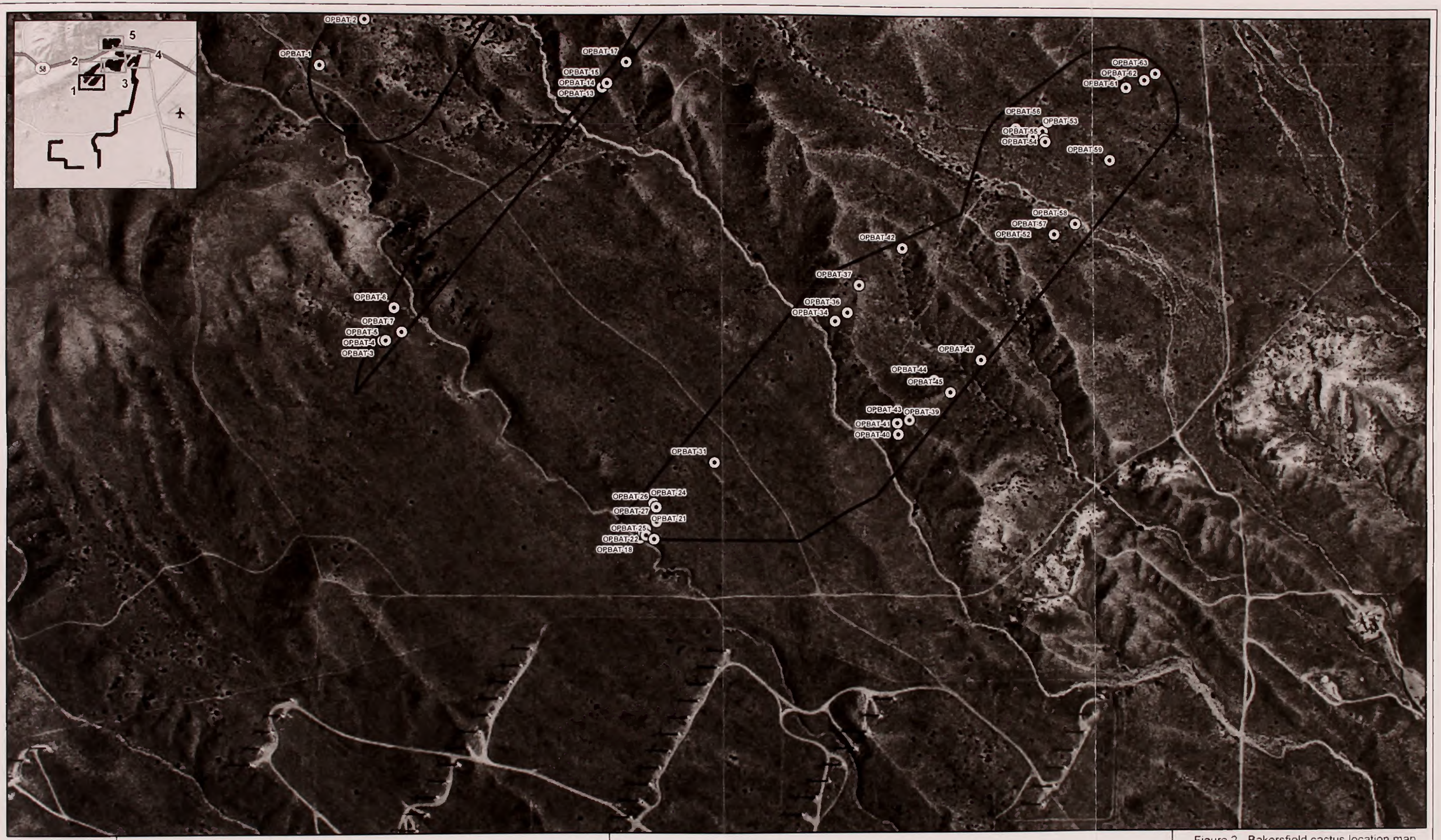
3.1.3 Adobe yampah

Adobe yampah is a white-flowered perennial herb in the Carrot family (*Apiaceae*). It reaches 13 to 36 inches in height, and has oblong fleshy tuberous roots, dissected, slightly fleshy basal leaves, and flowers clustered in compound umbels (Hickman 1993). Adobe yampah flowers from April to June (CNPS 2011). It grows in Chaparral, Cismontane Woodland, Coastal Scrub, and Pinyon and Juniper Woodland communities at elevations ranging from 985 to 5,900 feet (CNPS 2011). Adobe yampah has no State or Federal listing status, but is included on CNPS List 4.3, a watch list (ibid.).

Adobe yampah is endemic to California, where it is known from Kern, Los Angeles, Monterey, Santa Barbara, San Luis Obispo, Tulare, and Ventura counties (CNPS 2011). There are many collections from Kern County (CCH 2011). Prior to surveys conducted for this project, the closest record was about ten miles southwest of the Project area at Tomo-Kahni State Historical Park, northeast of Monolith and Tehachapi (ibid.).

Adobe yampah was detected in 2 locations within the survey area during botanical surveys. Although both plants observed were in early flowering condition, it is likely that other plants occur in the area but were not yet flowering, as the normal flowering period for this species in the area is in June (E. Kentner pers. obs.). Because vegetative individuals are inconspicuous, additional surveys are planned to estimate the full extent of the populations in the Project area.

Intentionally blank



GANDA

Legend

Alta East Wind Project Survey Area

Bakersfield cactus

Opuntia basilaris var. treleasei

Project Location

0 200 Meters

0 1,000 Feet

1 inch = 500 feet

Figure 2. Bakersfield cactus location map.
Alta East Wind Project

Kern County

June 2011

Map 1 of 5



OPBAT-50
OPBAT-46
OPBAT-38
OPBAT-33
OPBAT-32
OPBAT-35
OPBAT-23
OPBAT-16
OPBAT-30
OPBAT-8
OPBAT-12
OPBAT-11
OPBAT-10
OPBAT-9
OPBAT-29
OPBAT-28
OPBAT-2

GANDA

Legend

Alta East Wind Project Survey Area

Bakersfield cactus

Opuntia basilaris var. *treleasei*



0 200 Meters

0 1,000 Feet

1 inch = 500 feet

Figure 2. Bakersfield cactus location map.
Alta East Wind Project

Kern County

June 2011



GANDA

Legend

Alta East Wind Project Survey Area

Bakersfield cactus

Opuntia basilaris var. *treleasei*

Project Location

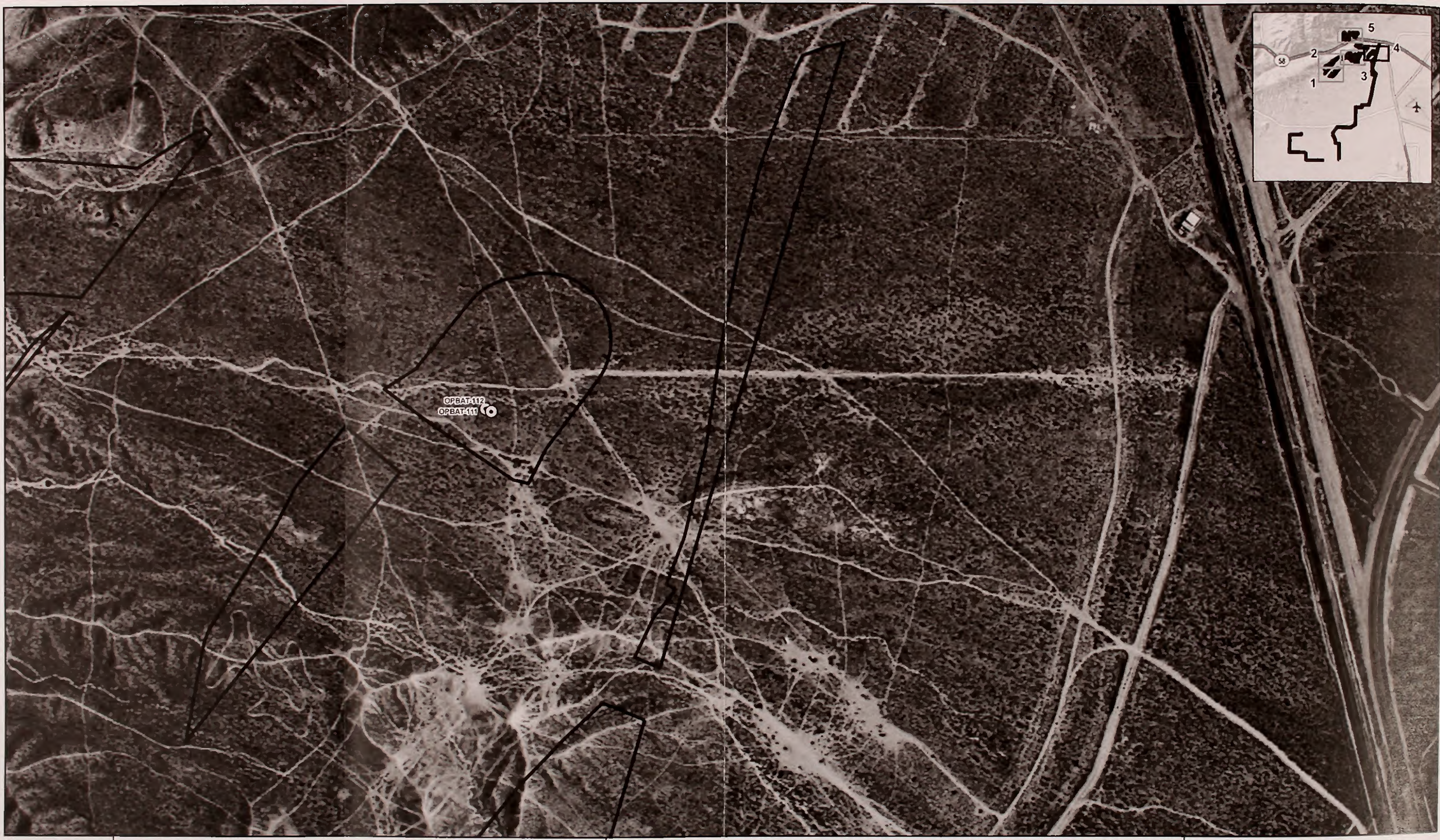
Meters
0 200
Feet
0 1,000
1 inch = 500 feet

Figure 2. Bakersfield cactus location map.
Alta East Wind Project

Kern County

June 2011

Map 3 of 5



GANDA

Legend

Alta East Wind Project Survey Area

Bakersfield cactus

Opuntia basilaris var. treleasei

Project Location

0 200 Meters

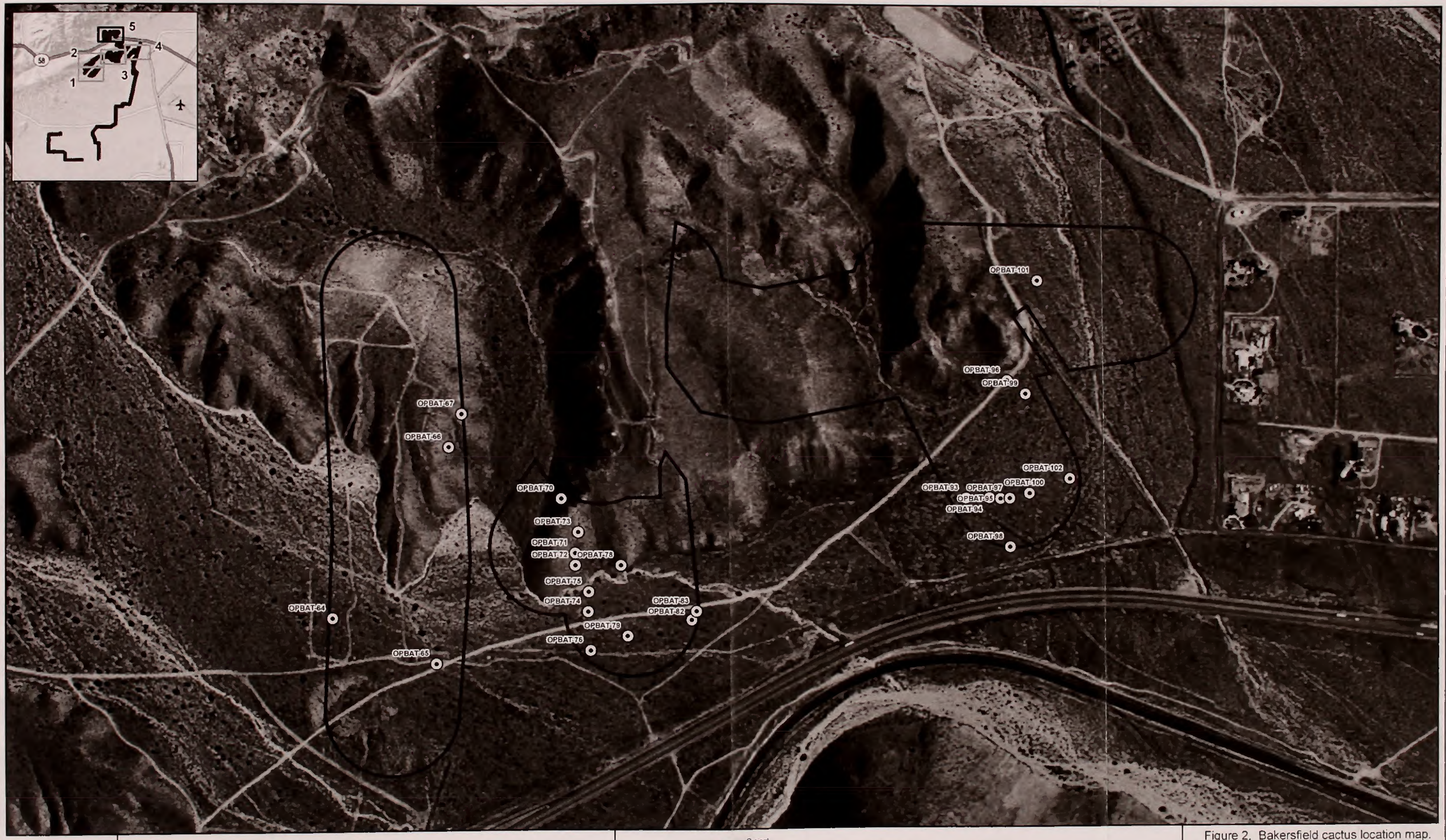
0 1,000 Feet

1 inch = 500 feet

Figure 2. Bakersfield cactus location map.
Alta East Wind Project

Kern County

June 2011



GANDA

Legend

Alta East Wind Project Survey Area

Bakersfield cactus
Opuntia basilaris var. treleasei

Project Location

Meters
0 200
Feet
0 1,000
1 inch = 500 feet

Figure 2. Bakersfield cactus location map.
Alta East Wind Project

Kern County

June 2011

Map 5 of 5



GANDA

Legend

Alta East Wind Project Survey Area

Pale-yellow Layia Suitable Habitat

Special Status Plants

▲ Layia Heterotricha - Pale-yellow Layia

□ Perideridia Pringlei - Adobe Yampah



0 200 Meters

0 1,000 Feet

1 inch = 500 feet

Figure 3. Special-status plants location map.
Alta East Wind Project

Kern County

June 2011

Map 1 of 2



GANDA

Legend

Alta East Wind Project Survey Area

Pale-yellow Layia Suitable Habitat

Special Status Plants

Layia Heterotricha - Pale-yellow Layia

Perideridia Pringlei - Adobe Yampah

Project Location

0 200 Meters

0 1,000 Feet

1 inch = 500 feet

Figure 3. Special-status plants location map.
Alta East Wind Project

Kern County

June 2011

Map 2 of 2

3.2 Special-status plants not observed, but with the potential to occur on the project site

Of the 45 species determined to have the potential to occur in the vicinity of the project area as a result of the literature and database searches, 34species have been determined to be absent from the project area based on the survey results. Three species were observed, 8 species are unlikely to occur (Table 1).

Species accounts and assessments of habitat suitability within the Project survey area for each of the special-status species not observed, but with the potential to occur in the Project vicinity are presented in Appendix E.

3.3 California Desert Native Plants Act

Four species afforded protection under the CDNPA, in addition to Joshua trees (Section 3.4 below) were observed within the survey area (Figure 4). A total of 673 silver cholla (*Opuntia echinocarpa*), 1,433 chaparral yucca (*Yucca whipplei*), 728 beavertail cactus, and 112 Bakersfield cactus were inventoried and mapped (Figure 3).

3.4 Joshua trees

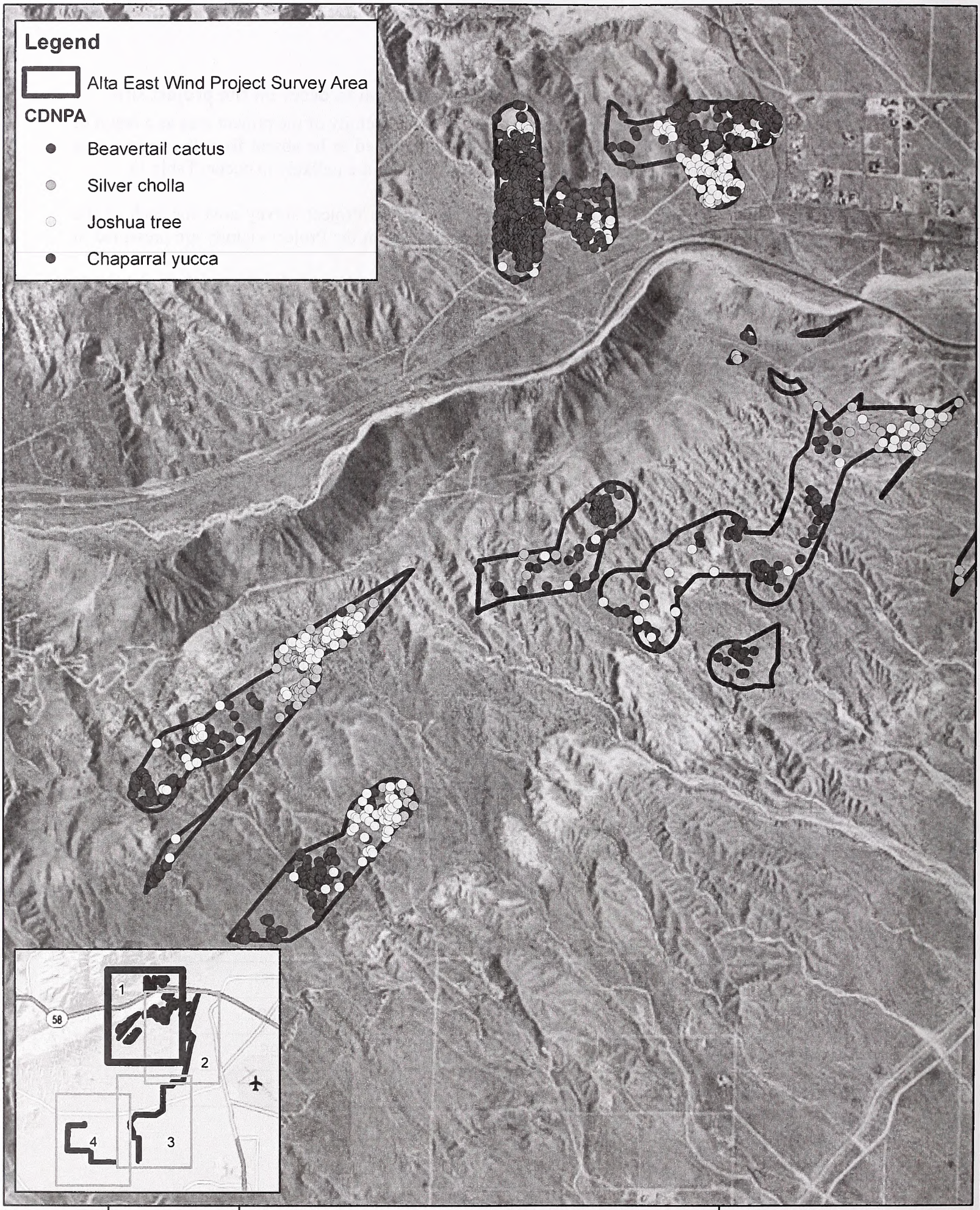
A total of 1,135 Joshua trees meeting the "large" size criteria established in the AOCM Joshua Tree Avoidance and Mitigation (CH2M Hill 2010a) Plan were inventoried and mapped (Figure 4).

3.5 Invasive plant species

Portions of the Project area have been grazed by sheep for an unknown period of time, a disturbance regime that seems to have favored the establishment and spread of many species of invasive plant species. Widespread and abundant plant species observed to occur at various densities throughout the Project area include cheatgrass, red brome, Mediterranean grass and redstem stork's bill. Populations of these species were not tallied or mapped for this report. Mapped species of invasive plant species occurring on the Project site include ripgut brome (*Bromus diandrus*), flixweed (*Descurainia sophia*), shortpod mustard (*Hirschfeldia incana*), wall barley (*Hordeum murinum*), tumble mustard (*Sisymbrium altissimum*), and oriental hedge mustard (*Sisymbrium orientale*). Table 4 presents the number of locations and estimated total number of individuals observed for each invasive plant species mapped in the Project area. The locations of invasive weed infestations are depicted in Figure 5.

Table 3. Invasive plant species observed on the Alta East Wind Energy Project site.

Invasive plant species	Sites mapped	Est. No. observed
Ripgut brome	3	320
Flixweed	4	53
Shortpod mustard	6	160
Wall barley	14	3,801
Tumble mustard	4	96
Oriental hedge mustard	9	130



GANDA

Project Location:

Source: ESRI, World Street Map, GANDA GIS 2011

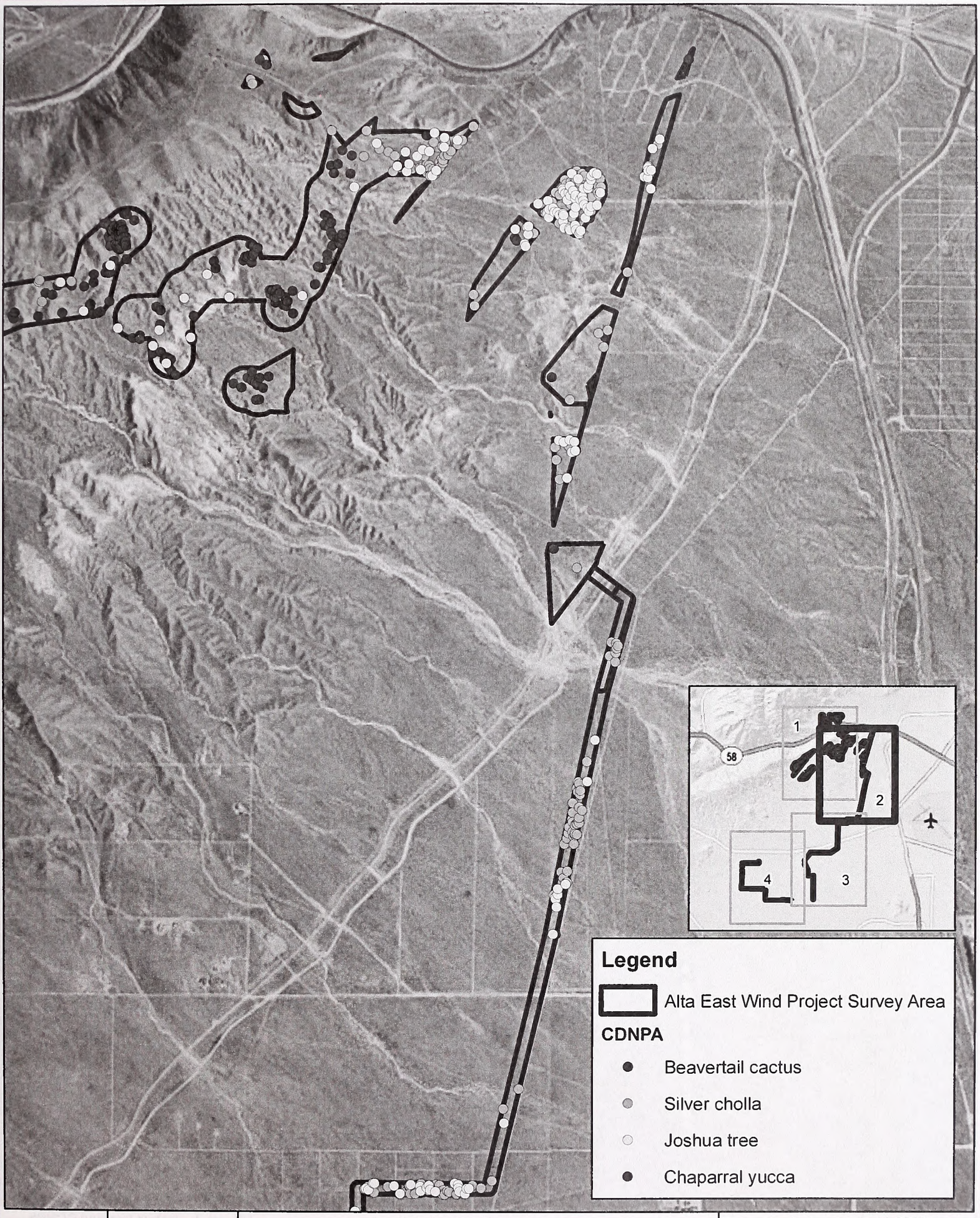
0 1 Kilometers

0 1 Miles

Figure 4. Joshua tree and CDNPA species location map.
Alta East Wind Project

Kern County

June 2011



GANDA

Project Location:

Source: ESRI, World Street Map; GANDA GIS 2011

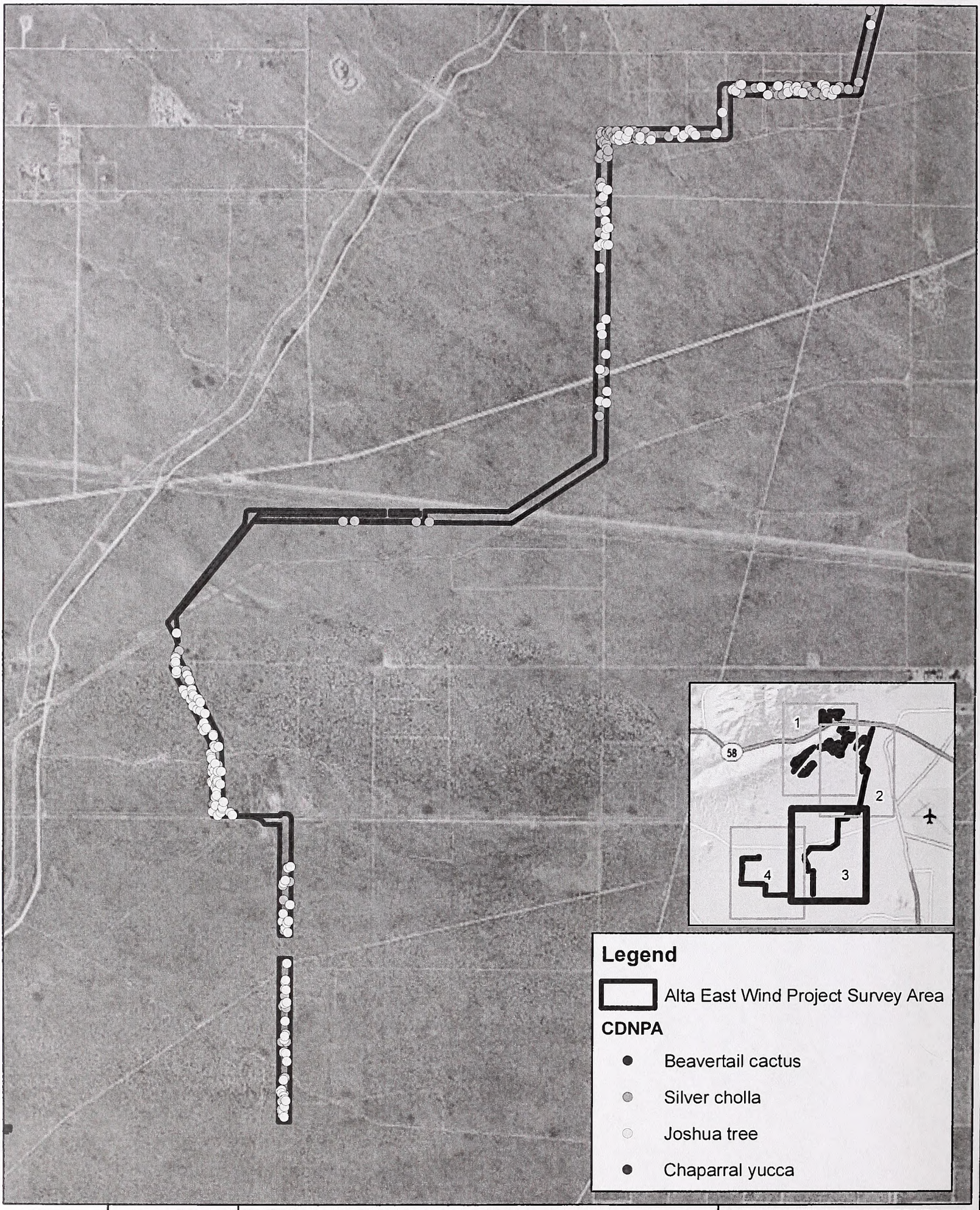
0 1 Kilometers

0 1 Miles

Figure 4. Joshua tree and CDNPA species location map.
Alta East Wind Project

Kern County

June 2011



GANDA

Project Location:

Source: ESRI, World Street Map; GANDA GIS 2011

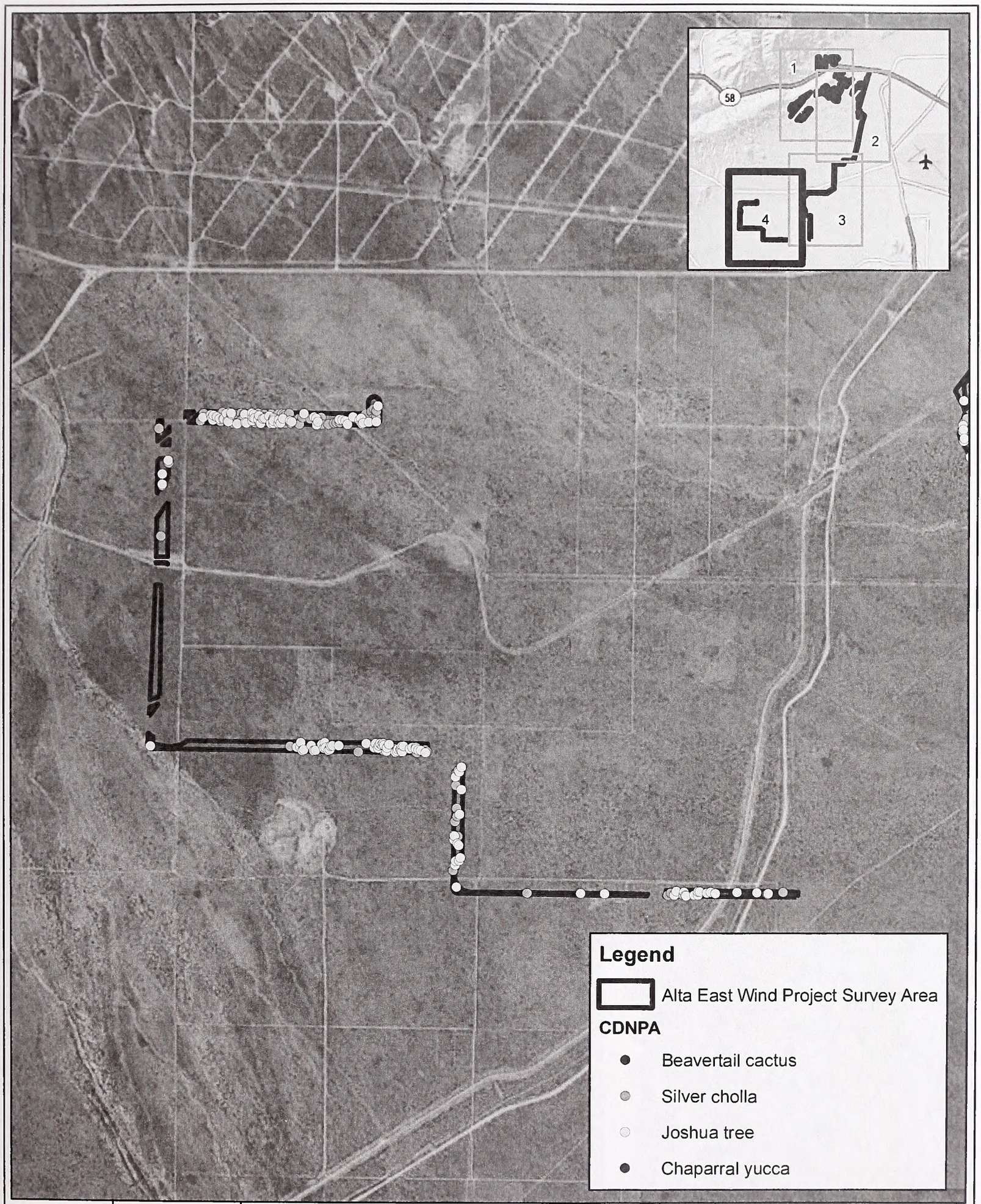
0 1 Kilometers

0 1 Miles

Figure 4. Joshua tree and CDNPA species location map.
Alta East Wind Project

Kern County

June 2011



GANDA

Project Location:

Source: ESRI, World Street Map; GANDA GIS 2011

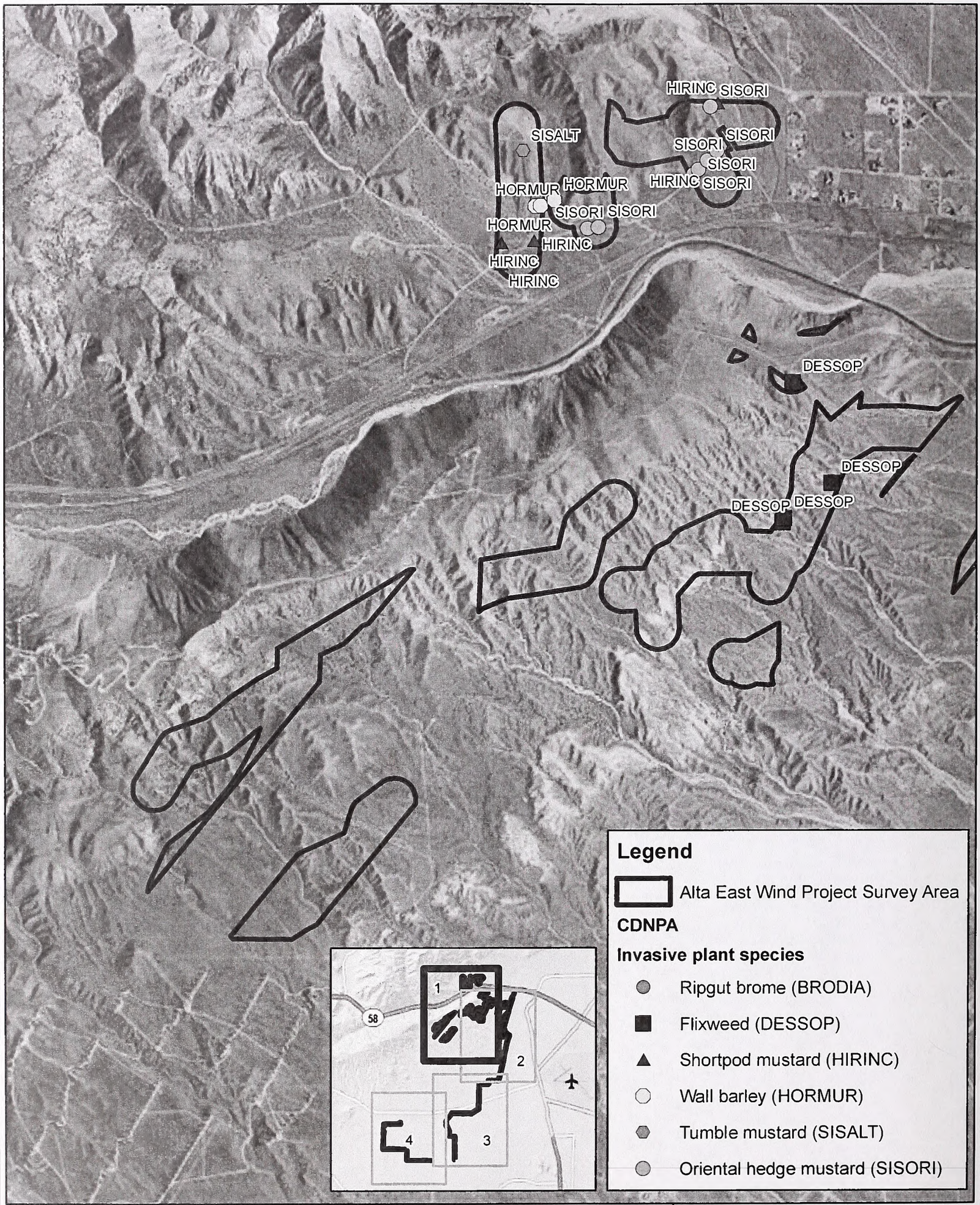
0 1 Kilometers

0 1 Miles

Figure 4. Joshua tree and CDNPA species location map.
Alta East Wind Project

Kern County

June 2011



GANDA

Project Location

Source: ESRI, World Street Map, GANDA GIS 2011

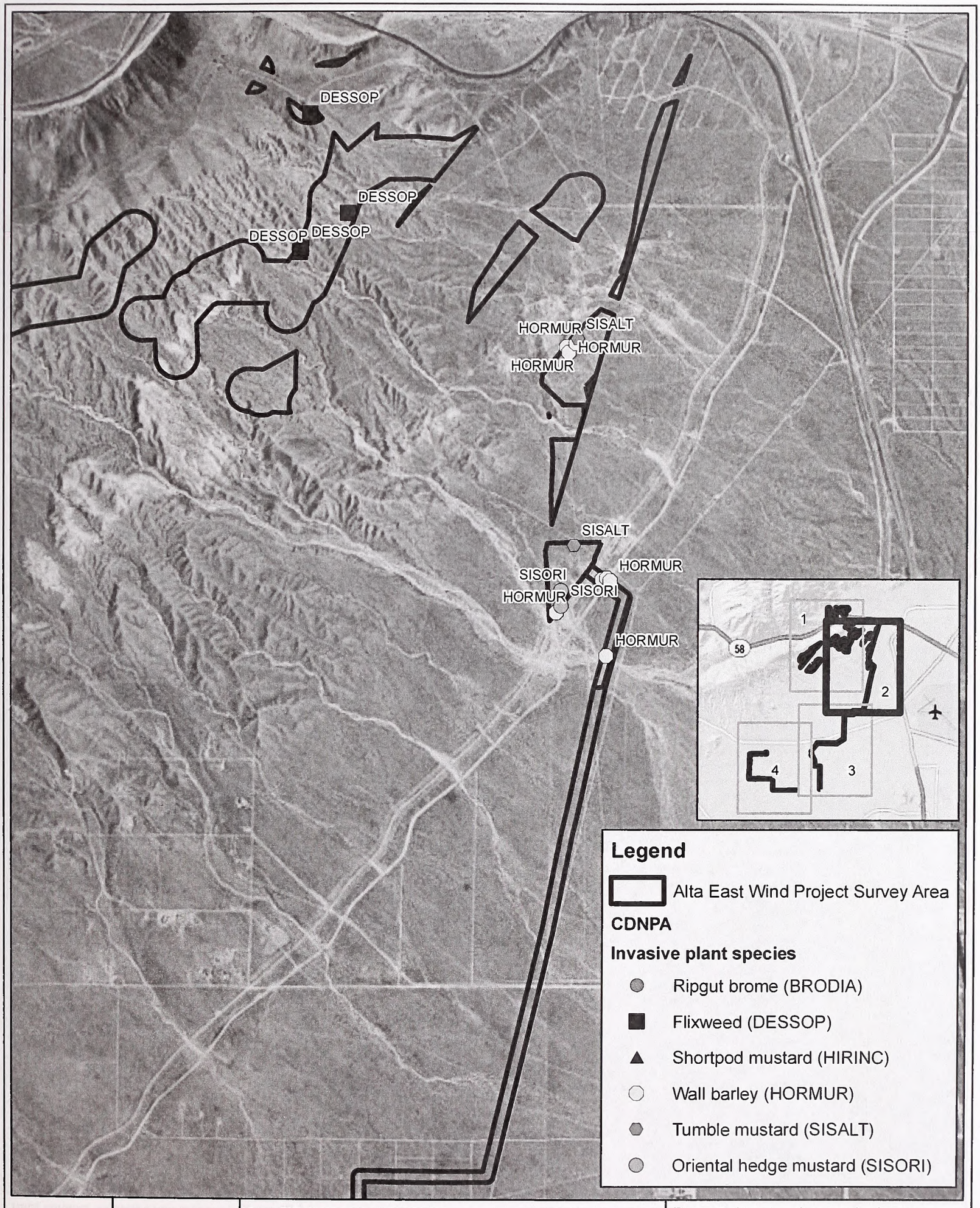
Kilometers
0 1

Miles
0 1

Figure 5. Invasive plant species location map.
Alta East Wind Project

Kern County

June 2011



GANDA

Project Location:

Source: ESRI, World Street Map; GANDA GIS 2011

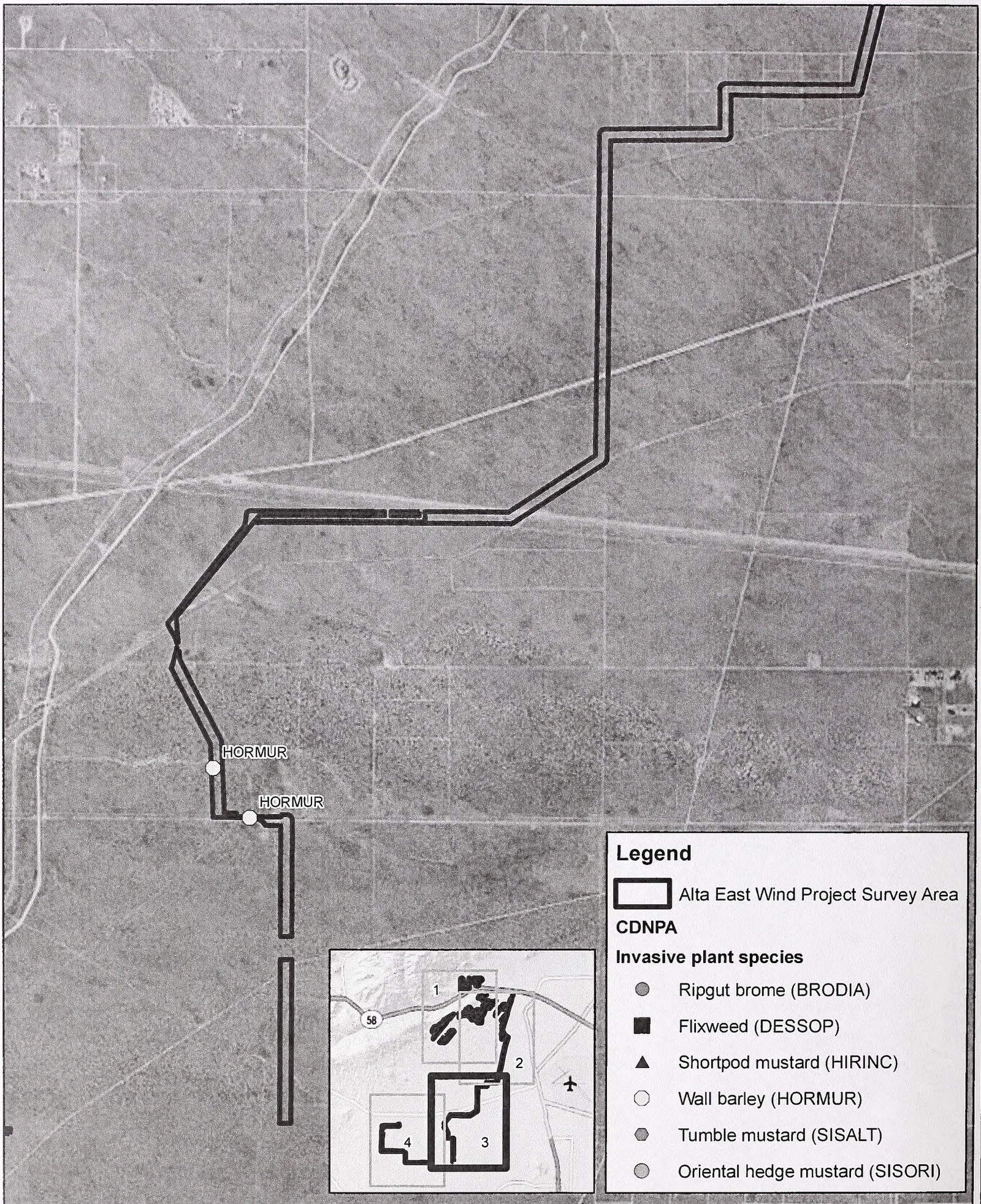
0 1 Kilometers

0 1 Miles

Figure 5. Invasive plant species location map. Alta East Wind Project

Kern County

June 2011



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Project Location:

Source: ESRI, World Street Map; GANDA GIS 2011

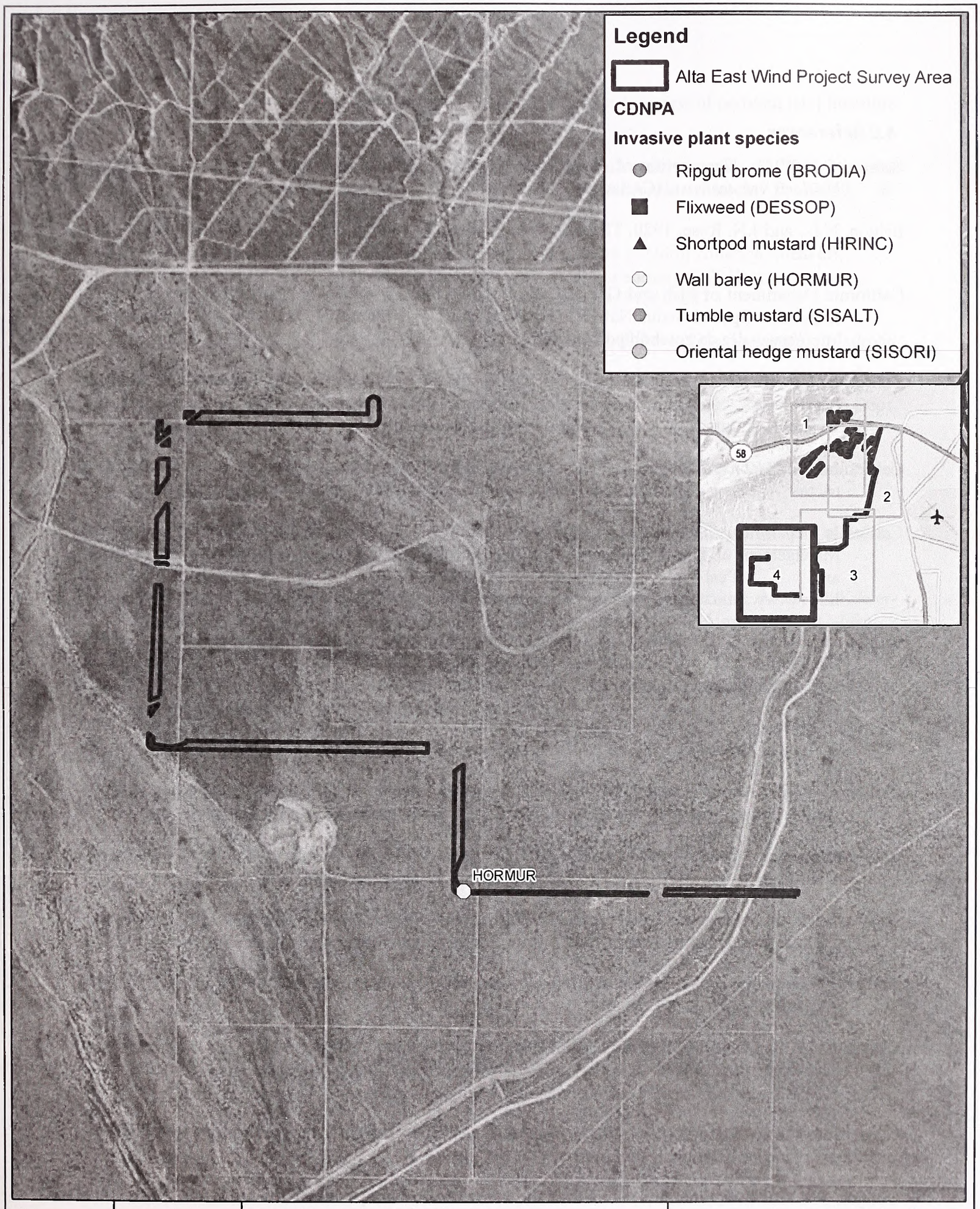
Kilometers
0 1

Miles
0 1

Figure 5. Invasive plant species location map.
Alta East Wind Project

Kern County

June 2011



GANDA

Project Location:

Source: ESRI, World Street Map; GANDA GIS 2011

0 1 Kilometers

0 1 Miles

Figure 5. Invasive plant species location map.
Alta East Wind Project

Kern County

June 2011

4.0 References

Bowen, C.L. 1987. Segregation of *Opuntia treleasei* and *Opuntia treleasei* var. *kernii* from *Opuntia basilaris* var. *treleasei* (Cactaceae). Unpublished draft manuscript, 9 pp.

Britton, N.L., and J.N. Rose. 1920. The Cactaceae. Carnegie Institute, Washington, DC, Publication 248, 1:1-236.

California Department of Fish and Game (CDFG). Nov. 2009a. Protocol for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities. Sacramento, CA. http://www.dfg.ca.gov/bdb/pdfs/guideplt.pdf.

California Department of Fish and Game (CDFG). 2009b. Vegetation Classification and Mapping Program List of California Vegetation Alliances. Biogeographic Data Branch. Sacramento, CA. Available at: http://www.dfg.ca.gov/biogeodata/vegcamp/

California Department of Fish and Game (CDFG). 2011. Taxonomy and identification of Bakersfield cactus: A review of pertitent [sic] literature with recommendations. Unpublished report.

California Department of Food and Agriculture (CDFA). 2010. Notes on Identification, Biology, and Management of Plants Defined as Noxious Weed by California Law. Division of Plant Health and Pest Preventions Services. Available at: http://www.cdfa.ca.gov/phpps/ipc/encycloweedia/encycloweedia_hp.htm

California Invasive Plant Council (Cal-IPC). 2006. California Invasive Plant Inventory. Cal-IPC Publication 2006-02. California Invasive Plant Council: Berkeley, CA. Available at: http://www.cal-ipc.org/ip/inventory/weedlist.php

California Native Plant Society (CNPS). 2001. Botanical survey guidelines of the California Native Plant Society. 9 December 1983 / Revised 2 June 2001.

California Native Plant Society (CNPS). 2011. Inventory of rare and endangered plants of California (online edition, version). Accessed at: http://cnps.site.aplus.net/cgi-bin/inv/inventory.cgi

California Natural Diversity Database (CNDDB). 2011a. RareFind3. Electronic database. Sacramento, California.

California Natural Diversity Database (CNDDB). 2011b. Special Vascular Plants, Bryophytes, and Lichens List. Quarterly publication. 71 pp.

CH2M Hill Engineers (CH2M HILL). 2010a. Joshua tree avoidance and mitigation plan, Alta-Oak Creek Mojave Wind Project. February.

CH2M HILL Engineers (CH2M HILL). 2010b. Biological Resources Report for the Alta East Wind Energy Project in Kern County, California. Prepared for Alta Windpower Development, LLC. August.

Consortium of California Herbaria (CCH). Accessed March 2011. Accession results for various species. http://ucjeps.berkeley.edu/consortium/.

Coulter, J.M. 1896. Preliminary revision of the North American species of Echinocactus, Cereus, and Opuntia. Contributions of the U.S. National Herbarium

Cypher, E. 2011. Taxonomy and identification of Bakersfield cactus: A review of pertitent [sic] literature with recommendations. Unpublished report.

Endangered Species Recovery Program (ESRP), California State University, Stanislaus. 2006. Species account for *Opuntia basilaris* var. *treleasei*. Accessed March 5, 2010, at: http://esrp.csustan.edu/speciesprofiles/profile.php?sp=opba

Flora of North America Editorial Committee, eds (FNA). 1993. Flora of North America North of Mexico. 15+ vols. New York and Oxford. Vol. 4. Accessed February 7, 2010 at: http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=242413847

Gowen. 2008. New taxa following a reassessment of *Eriastrum sparsiflorum* (Polemoniaceae). Madroño Vol. 55: 82-87.

Griffiths, D., and R.F. Hare. 1906. Prickly pear and other cacti as food for stock. II. New Mexico Dept. Agric. Bull. 60:81-82

Hickman, J., ed. 1993. The Jepson manual: Higher plants of California. University of California Press, Berkeley, CA.

Holland, R. F. 1986. Preliminary descriptions of the terrestrial natural communities of California. California Department of Fish and Game. Unpublished report.

Keeler-Wolf, Todd. 2007. Chapter 22. Mojave desert scrub vegetation. In: Barbour, M.G., T. Keeler-Wolf, and A.A. Schoenherr. 2007. *Terrestrial vegetation of California.* University of California Press, Berkeley.

Mason, H. L. 1945. The genus *Eriastrum* and the influence of Bentham and Gray upon the problem of generic confusion in Polemoniaceae. Madroño 8:65-91.

Munz, P, and D.D. Keck. 1973. *A California Flora and Supplement*. Univ. of California Press, Berkeley.

National Weather Service (NWS). 2011. Climate data for Mojave California. Accessed at: http://www.wrh.noaa.gov/hnx/coop/mojave.htm

Natural Resources Conservation Service (NRCS). 2011. Soil Data Mart. Online Soils data for Kern County. Accessed at: http://soildatamart.nrcs.usda.gov/

Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. A manual of California vegetation, 2nd ed. California Native Plant Society, Sacramento, CA.

Twisselmann, E. C. 1967. A flora of Kern County, California. *The Waksman Journal of Biology* 25(1-2):1-395.

U.S. Fish and Wildlife Service (USFWS). 1996a. Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants. USFWS, September 23, 1996. Available at: http://www.fws.gov/sacramento/es/documents/listed_plant_survey_guidelines.htm

U.S. Fish and Wildlife Service (USFWS). 1996b. Endangered and Threatened Wildlife and Plants; Review of Plant and Animal Taxa that are Candidates for Listing as Endangered or Threatened Species; Notice of Review; Proposed Rule. Federal Register 61(40): 7596-7613.

U.S. Fish and Wildlife Service (USFWS). 1998. Recovery Plan for Upland Species of the San Joaquin Valley, California. Region 1, Portland, Oregon. Accessed March 10, 2010, at: http://ecos.fws.gov/docs/recovery_plans/1998/980930a.pdf

U.S. Fish and Wildlife Service (USFWS). 2006. List of federal candidates for listing, available at: http://ecos.fws.gov/endangered/candidates/index.html

U.S. Fish and Wildlife Service (USFWS). 2011. List of federally listed threatened & endangered species which may occur in Kern, Los Angeles, and San Bernardino counties, CA. USFWS, Ventura Fish and Wildlife Office, Ventura, CA, available at: http://www.fws.gov/ventura/speciesinfo/

Weather Underground. 2011. Precipitation data for Mojave California. Accessed at: http://www.wunderground.com.

Appendix A

Vascular Plant Species Observed

Scientific Name	Common Name
Gymnosperms	
Cupressaceae	**Cypress family**
Juniperus californica	California juniper
Ephedraceae	**Mormon-tea family**
Ephedra nevadensis	Nevada jointfir
Ephedra viridis	Mormon tea
Dicots	
Apiaceae	**Carrot family**
Lomatium macrocarpum	bigseed biscuitroot
Lomatium mohavense	Mojave desertparsley
Asteraceae	**Aster family**
Acamptopappus sphaerocephalus	rayless goldenhead
Agoseris retrorsa	spearleaf agoseris
Ambrosia dumosa	white bursage
Anisocoma acaulis	scalebud
Calycoseris parryi	yellow tackstem
Chaenactis fremontii	pincushion flower
Chrysothamnus nauseosus	rubber rabbitbrush
Chrysothamnus teretifolius	green Rabbitbrush
Cirsium occidentale var. occidentale	cobwebby thistle
Coreopsis bigelovii	Bigelow's tickseed
Coreopsis calliopsidea	leafstem tickseed
Encelia actonii	Acton's brittlebush
Ericameria cooperi	Cooper's goldenbush
Ericameria linearifolia	narrowleaf goldenbush
Eriophyllum pringlei	Pringle's woolly sunflower
Eriophyllum wallacei	Wallace Eriophyllum
Filago depressa	dwarf cottonrose
Gutierrezia sarothrae	broom snakeweed
Hymenoclea salsola	burrobrush
Lactuca serriola	prickly lettuce
Lasthenia californica	California goldfields
Layia glandulosa	whitedaisy tidytips
Layia heterotricha	paleyellow tidytips
Lepidospartum squamatum	California scale broom
Lessingia filaginifolia	California aster

Scientific Name	Common Name
Lessingia lemmonii	Lemmon's lessingia
Malacothrix coulteri	snake's head
Malacothrix glabrata	smooth desertdandelion
Stephanomeria exigua	small wirelettuce
Stephanomeria pauciflora	brownplume wirelettuce
Stephanomeria virgata	rod wirelettuce
Syntrichopappus fremontii	yellowray Fremont's-gold
Tetradymia stenolepis	Mojave cottonthorn
Uropappus lindleyi	Lindley's silverpuffs
Xylorhiza tortifolia	Mojave woodyaster
Boraginaceae	**Borage family**
Amsinckia tessellata	bristly fiddleneck
Cryptantha circumscissa	cushion cryptantha
Cryptantha decipiens	gravelbar cryptantha
Cryptantha mohavensis	Mojave cryptantha
Cryptantha nevadensis	Nevada cryptantha
Cryptantha pterocarya	wingnut cryptantha
Cryptantha utahensis	scented cryptantha
Heliotropium curassavicum	salt heliotrope
Pectocarya linearis	sagebrush combseed
Pectocarya penicillata	sleeping combseed
Pectocarya platycarpa	broadfruit combseed
Pectocarya setosa	moth combseed
Plagiobothrys arizonicus	Arizona popcornflower
Brassicaceae	**Mustard family**
Arabis pulchra	beautiful rockcress
Brassica nigra	black mustard
Caulanthus coulteri	Coulter's wild cabbage
Caulanthus inflatus	desert candle
Descurainia pinnata	western tansymustard
Descurainia sophia	herb sophia
Guillenia lasiophylla	California mustard
Lepidium fremontii	desert pepperweed
Sisymbrium altissimum	tall tumblemustard
Sisymbrium orientale	Indian hedgemustard
Stanleya pinnata	desert prince's plume
Tropidocarpum gracile	dobie pod
Cactaceae	**Cactus family**
Opuntia basilaris var. *basilaris*	beavertail pricklypear
Opuntia echinocarpa	silver cholla
Campanulaceae	**Bellflower family**
Nemacladus orientalis	eastern threadplant

Scientific Name	Common Name
Chenopodiaceae	**Goosefoot family**
Atriplex canescens	fourwing saltbush
Atriplex polycarpa	cattle saltbush
Grayia spinosa	spiny hopsage
Krascheninnikovia lanata	winterfat
Monolepis nuttalliana	Nuttall's povertyweed
Cucurbitaceae	**Cucumber family**
Marah fabaceus	California manroot
Cuscutaceae	**Dodder family**
Cuscuta californica	chaparral dodder
Euphorbiaceae	**Spurge family**
Chamaesyce albomarginata	whitemargin sandmat
Eremocarpus setigerus	dove weed
Fabaceae	**Pea family**
Astragalus didymocarpus var.	dwarf white milkvetch
Astragalus lentiginosus var. *variabilis*	freckled milkvetch
Astragalus pachypus var. *pachypus*	thickpod milkvetch
Lotus humistratus	foothill deervetch
Lupinus bicolor	miniature lupine
Lupinus concinnus	bajada lupine
Lupinus excubitus	grape soda lupine
Lupinus microcarpus	chick lupine
Trifolium gracilentum	pinpoint clover
Geraniaceae	**Geranium family**
Erodium cicutarium ssp. *cicutarium*	redstem stork's bill
Hydrophyllaceae	**Waterleaf family**
Emmenanthe penduliflora var. *penduliflora*	whisperingbells
Nama demissum	purplemat
Phacelia distans	distant phacelia
Phacelia fremontii	Fremont's phacelia
Phacelia glandulifera	sticky phacelia
Phacelia heterophylla	varileaf phacelia
Phacelia tanacetifolia	lacy phacelia
Lamiaceae	**Mint family**
Salazaria mexicana	Mexican bladdersage
Salvia columbariae	chia
Salvia dorrii	purple sage

Scientific Name	Common Name
Loasaceae	**Loasa family**
Mentzelia albicaulis	whitestem blazingstar
Mentzelia veatchiana	Veatch's blazingstar
Malvaceae	**Mallow family**
Eremalche exilis	white mallow
Sphaeralcea ambigua	desert globemallow
Nyctaginaceae	**Four o'clock family**
Mirabilis bigelovii	wishbone-bush
Onagraceae	**Evening Primrose family**
Camissonia boothii	Booth's evening primrose
Camissonia campestris	Mojave suncup
Camissonia claviformis	browneyes
Camissonia pallida ssp. *pallida*	paleyellow suncup
Camissonia palmeri	Palmer evening primrose
Papaveraceae	**Poppy family**
Eschscholzia minutiflora ssp. *minutiflora*	pygmy golden poppy
Platystemon californicus	creamcups
Polemoniaceae	**Phlox family**
Eriastrum densifolium	giant woollystar
Eriastrum pluriflorum	Tehachapi woollystar
Gilia brecciarum	Nevada gilia
Gilia capitata	bluehead gilia
Gilia latiflora	hollyleaf gilia
Gilia latifolia	broadleaf gilia
Gilia modocensis	Modoc gilia
Linanthus aureus	golden deserttrumpets
Linanthus parryae	sandblossoms
Loeseliastrum matthewsii	desert calico
Loeseliastrum schottii	Schott's calico
Polygonaceae	**Buckwheat family**
Centrostegia thurberi	red triangles
Chorizanthe brevicornu	brittle spineflower
Chorizanthe watsonii	fivetooth spineflower
Eriogonum angulosum	anglestem buckwheat
Eriogonum brachyanthum	shortflower buckwheat
Eriogonum deflexum	flatcrown buckwheat
Eriogonum fasciculatum var. *polifolium*	Eastern Mojave buckwheat

Scientific Name	Common Name
Eriogonum gracillimum	rose and white buckwheat
Eriogonum heermannii var. *heermannii*	Heermann's buckwheat
Eriogonum nudum var. *westonii*	Weston's buckwheat
Eriogonum plumatella	yucca buckwheat
Eriogonum pusillum	yellowturbans
Eriogonum trichopes	little deserttrumpet
Eriogonum viridescens	twotooth buckwheat
Mucronea perfoliata	perfoliate spineflower
Portulacaceae	**Purslane family**
Calyptridium monandrum	pussy paws
Claytonia perfoliata	miner's lettuce
Ranunculaceae	**Buttercup family**
Delphinium parishii	desert larkspur
Rosaceae	**Rose family**
Purshia tridentata var. *glandulosa*	antelope brush
Scrophulariaceae	**Figwort family**
Castilleja applegatei ssp. *martinii*	wavyleaf Indian paintbrush
Castilleja chromosa	desert Indian paintbrush
Mimulus bigelovii	Bigelow's monkeyflower
Penstemon incertus	Mojave beardtongue
Solanaceae	**Potato family**
Lycium andersonii	Anderson's box thorn
Lycium cooperi	peach thorn
Zygophyllaceae	**Creosote-bush family**
Larrea tridentata	creosote bush
Monocots	
Agavaceae	**Century-plant family**
Yucca brevifolia	Joshua tree
Yucca whipplei	chaparral yucca
Liliaceae	**Lily family**
Allium fimbriatum var. *fimbriatum*	fringed onion
Calochortus kennedyi var. *kennedyi*	desert mariposa lily
Dichelostemma capitatum	bluedicks
Poaceae	**Grass family**
Achnatherum hymenoides	Indian ricegrass
Achnatherum lemmonii	Lemmon's needlegrass
Achnatherum speciosum	desert needlegrass
Bromus carinatus	California brome
Bromus diandrus	ripgut brome

Scientific Name	Common Name
Bromus madritensis ssp. *rubens*	red brome
Bromus tectorum	cheatgrass
Elymus elymoides	squirreltail
Hordeum murinum ssp. *leporinum*	hare barley
Poa secunda	Sandberg bluegrass
Schismus	Mediterranean grass
Vulpia microstachys	small fescue

Appendix B

Bakersfield cactus locations

(UTM NAD 83 Zone 11S)

Map label	Easting	Northing
OPBAT-1	385465.690	3883834.270
OPBAT-2	385542.720	3883913.360
OPBAT-3	385572.260	3883358.170
OPBAT-4	385574.190	3883359.500
OPBAT-5	385579.350	3883360.230
OPBAT-6	385593.770	3883416.360
OPBAT-7	385606.790	3883374.630
OPBAT-8	385746.130	3884094.310
OPBAT-9	385875.440	3883978.100
OPBAT-10	385935.690	3884005.300
OPBAT-11	385937.960	3884104.940
OPBAT-12	385938.360	3884090.580
OPBAT-13	385951.760	3883795.840
OPBAT-14	385952.530	3883797.270
OPBAT-15	385960.340	3883805.330
OPBAT-16	385974.370	3884265.080
OPBAT-17	385993.270	3883841.040
OPBAT-18	386017.820	3883017.510
OPBAT-19	386018.780	3883033.320
OPBAT-20	386024.000	3883027.490
OPBAT-21	386027.880	3883033.250
OPBAT-22	386028.320	3883022.520
OPBAT-23	386029.070	3884325.200
OPBAT-24	386041.850	3883078.130
OPBAT-25	386042.410	3883016.450
OPBAT-26	386045.710	3883071.680
OPBAT-27	386046.870	3883046.040
OPBAT-28	386086.620	3883992.420
OPBAT-29	386089.170	3883988.900
OPBAT-30	386115.980	3884229.310
OPBAT-31	386146.880	3883149.430
OPBAT-32	386313.900	3884355.820
OPBAT-33	386341.450	3884377.960
OPBAT-34	386356.920	3883393.090
OPBAT-35	386365.550	3884306.810
OPBAT-36	386378.310	3883407.710
OPBAT-37	386398.390	3883455.430
OPBAT-38	386440.760	3884516.320
OPBAT-39	386464.370	3883217.920
OPBAT-40	386465.570	3883216.540
OPBAT-41	386466.730	3883196.790
OPBAT-42	386473.760	3883520.130
OPBAT-43	386486.180	3883222.070
OPBAT-44	386529.630	3883291.700
OPBAT-45	386557.790	3883270.360
OPBAT-46	386608.380	3884633.370

Map label	Easting	Northing
OPBAT-47	386611.970	3883326.960
OPBAT-48	386670.480	3883728.550
OPBAT-49	386673.120	3883729.480
OPBAT-50	386674.620	3884697.140
OPBAT-51	386703.230	3883714.120
OPBAT-52	386712.240	3883564.470
OPBAT-53	386720.290	3883724.630
OPBAT-54	386723.750	3883711.720
OPBAT-55	386725.090	3883706.740
OPBAT-56	386729.710	3883741.170
OPBAT-57	386740.510	3883545.720
OPBAT-58	386777.180	3883565.020
OPBAT-59	386839.010	3883675.480
OPBAT-60	386854.450	3883824.130
OPBAT-61	386866.270	3883801.930
OPBAT-62	386898.210	3883815.150
OPBAT-63	386917.860	3883827.090
OPBAT-64	387398.480	3886801.090
OPBAT-65	387574.650	3886722.350
OPBAT-66	387596.670	3887093.300
OPBAT-67	387618.260	3887150.600
OPBAT-68	387632.680	3884906.040
OPBAT-69	387687.420	3885057.250
OPBAT-70	387788.930	3887004.340
OPBAT-71	387812.910	3886911.260
OPBAT-72	387813.060	3886890.230
OPBAT-73	387818.170	3886947.210
OPBAT-74	387834.640	3886810.460
OPBAT-75	387835.820	3886844.640
OPBAT-76	387838.740	3886743.840
OPBAT-77	387872.760	3884940.800
OPBAT-78	387890.510	3886889.900
OPBAT-79	387902.510	3886768.510
OPBAT-80	387926.160	3885059.490
OPBAT-81	387963.320	3884877.990
OPBAT-82	388011.950	3886795.770
OPBAT-83	388020.000	3886810.540
OPBAT-84	388130.940	3884709.600
OPBAT-85	388146.030	3884695.580
OPBAT-86	388150.020	3884696.660
OPBAT-87	388165.530	3884789.510
OPBAT-88	388187.500	3884669.340
OPBAT-89	388194.460	3884886.780
OPBAT-90	388220.620	3884763.950
OPBAT-91	388236.050	3884786.410
OPBAT-92	388271.530	3884565.970

Map label	Easting	Northing
OPBAT-93	388485.980	3887002.920
OPBAT-94	388526.910	3887003.500
OPBAT-95	388546.160	3887001.810
OPBAT-96	388557.310	3887205.490
OPBAT-97	388562.080	3887002.400
OPBAT-98	388563.470	3886918.660
OPBAT-99	388588.950	3887183.030
OPBAT-100	388596.530	3887010.930
OPBAT-101	388609.480	3887378.180
OPBAT-102	388667.120	3887036.410
OPBAT-103	388712.260	3884467.450
OPBAT-104	388735.530	3884524.570
OPBAT-105	388822.330	3884659.540
OPBAT-106	388843.290	3884811.780
OPBAT-107	388890.260	3884879.540
OPBAT-108	388908.670	3884918.700
OPBAT-109	389008.720	3885200.410
OPBAT-110	389027.580	3885430.550
OPBAT-111	390336.450	3885426.330
OPBAT-112	390346.080	3885421.500

Appendix C

Special-status plant species locations

(UTM NAD 83 Zone 11S)

Species	Map label	Easting	Northing
Pale-yellow layia	LAHE-1	385903.436	3884206.930
Pale-yellow layia	LAHE-2	388460.421	3884893.170
Pale-yellow layia	LAHE-3	389011.556	3885290.620
Adobe yampah	PEPR5-1	385584.882	3883365.160
Adobe yampah	PEPR5-2	385605.042	3883370.310

Appendix D

Morphological characteristics of *Opuntia basilaris* plants occurring in the Project area

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
OPBAT-1	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-2	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-3	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-4	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-5	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-6	Bakersfield	raised	<8	most spines >6mm	>2 in some areoles	most pads w/ >5	no fruits available
OPBAT-7	Bakersfield	raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-8	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-9	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-10	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-11	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-12	Bakersfield	raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-13	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-14	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-15	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-16	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-17	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-18	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-19	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-20	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-21	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-22	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-23	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-24	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-25	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-26	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-27	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-28	Bakersfield	sunken	>8	most spines <6mm	<2 in all areoles	most pads w/ >5	no fruits available
OPBAT-29	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-30	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-31	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-32	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-33	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-34	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-35	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-36	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-37	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-38	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
OPBAT-39	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-40	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-41	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-42	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-43	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-44	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-45	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-46	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-47	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-48	Bakersfield	raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-49	Bakersfield	sunken	>8	most spines <6mm	<2 in all areoles	most pads w/ >5	no fruits available
OPBAT-50	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-51	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-52	Bakersfield	raised	>8	No spines	No spines	No spines	3-10 per upper areole
OPBAT-53	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-54	Bakersfield	flush	>8	most spines >6mm	<2 in all areoles	most pads w/ >5	no fruits available
OPBAT-55	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-56	Bakersfield	flush	>8	most spines <6mm	<2 in all areoles	most pads w/ <5	no fruits available
OPBAT-57	Bakersfield	raised	>8	most spines <6mm	<2 in all areoles	most pads w/ >5	no fruits available
OPBAT-58	Bakersfield	sunken	>8	most spines <6mm	<2 in all areoles	most pads w/ >5	no fruits available
OPBAT-59	Bakersfield	both sunken & flush	>8	most spines <6mm	<2 in all areoles	most pads w/ >5	no fruits available
OPBAT-60	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-61	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-62	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-63	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-64	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-65	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-66	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-67	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-68	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-69	Bakersfield	both sunken & flush	>8	No spines	No spines	No spines	3-10 per upper areole
OPBAT-70	Bakersfield	flush	<8	No spines	No spines	No spines	no fruits available
OPBAT-71	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-72	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-73	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-74	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-75	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-76	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-77	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-78	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-79	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-80	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-81	Bakersfield	raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-82	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
OPBAT-83	Bakersfield	flush	<8	No spines	No spines	No spines	no fruits available
OPBAT-84	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-85	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-86	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-87	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-88	Bakersfield	sunken	>8	No spines	>2 in some areoles	No spines	no fruits available
OPBAT-89	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-90	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-91	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-92	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-93	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-94	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-95	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-96	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-97	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-98	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-99	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-100	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-101	Bakersfield	raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-102	Bakersfield	raised	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-103	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-104	Bakersfield	raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-105	Bakersfield	both flush & raised	>8	No spines	No spines	No spines	no fruits available
OPBAT-106	Bakersfield	sunken	<8	most spines <6mm	<2 in all areoles	most pads w/ >5	no fruits available
OPBAT-107	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-108	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-109	Bakersfield	flush	>8	No spines	No spines	No spines	no fruits available
OPBAT-110	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-111	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
OPBAT-112	Bakersfield	flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	most spines <6mm	<2 in all areoles	most pads w/ <5	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no spines on fruit

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	most spines <6mm	<2 in all areoles	most pads w/ <5	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	1-2 per upper areole

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	Bo	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	1-2 per upper areole
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	most spines <6mm	<2 in all areoles	most pads w/ <5	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	1-2 per upper areole
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	Bo	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	Bo	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	1-2 per upper areol
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
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N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
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N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
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N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
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N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
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N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available

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N/A	Beavertail	both sunken & flush	Bo	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
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N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
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N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
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N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
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N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available

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N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
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N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
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N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
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N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
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N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
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N/A	Beavertail	both sunken & raise	>8	No spines	No spines	No spines	no spines on fruit
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N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
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N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
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N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	Bo	most spines <6mm	<2 in all areoles	most pads w/ <5	no fruits available
N/A	Beavertail	sunken	>8	most spines <6mm	<2 in all areoles	only 1 on plant	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available

Map label	Variety	Areoles	Areoles per row	Spine length	Spines per areole	Spines per pad	Spines on fruit
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
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N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken&flush&raised	>8	No spines	No spines	No spines	no fruits available
N/A	Beavertail	both sunken & flush	>8	No spines	No spines	No spines	no spines on fruit
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N/A	Beavertail	sunken	>8	No spines	No spines	No spines	no spines on fruit
N/A	Beavertail	sunken	Bo	No spines	No spines	No spines	no fruits available

Appendix E

Descriptions of special-status plants not observed, but with the potential to occur on the project site

Inyo Onion (*Allium atrorubens* var. *cristatum*)

Inyo onion is a bulbiferous herb in the Lily family (*Liliaceae*) found on sandy and rocky substrates within Joshua Tree Woodland, Mojavean Desert Scrub, and Pinyon and Juniper Woodland communities. Known occurrences range in elevation from 3,960 to 8,448 feet (CNPS 2011). Inyo onion has no State or Federal listing status but is included on CNPS List 4.3, a watch list (ibid.). The BLM designates it as a Plant of Interest (BLM 2010).

In California, Inyo onion has been found in Inyo, Kern, and San Bernardino counties (CNPS 2011). This variety is also known to occur in Nevada. The nearest known location is 42 mi northeast of the Project area in the Owens Peak watershed (CCH 2011).

Although suitable habitat is present, it is unlikely that Inyo onion would occur in the Project area since this variety has not been documented south of the Owens Peak watershed. Botanical surveys conducted by GANDA in April and May, during the flowering period of Inyo onion (April to June), did not detect this species within the survey area. Only one species of *Allium* was detected within the Project area, fringed onion (*A. fimbriatum* var. *fimbriatum*).

Spanish Needle onion (*Allium shevockii*)

Spanish Needle onion is a bulb-forming perennial herb in the Lily family (*Liliaceae)* that is 6-9 inches tall. It has showy flowers, with tepals (petal-like flower parts) that are white to light green below and maroon on the reflexed and curled distal half (Hickman 1993). The flowering time is from May to June (CNPS 2011). Spanish Needle onion is typically found on talus or loose, deep gravel derived from dark-colored granitic or andesitic rock, in Pinyon and Juniper Woodland and Upper Montane Coniferous Forest (CNPS 2011). It ranges in elevation from 2,800 to 8,200 feet (CNPS 2011). Spanish Needle onion has no State or Federal listing status, but is included on CNPS List 1B.3, indicating that it is rare, threatened or endangered in California and elsewhere, with a low threat level in California (ibid.). It is designated by the BLM as a Special-Status species (BLM 2010).

Spanish Needle onion is known only from Kern County, on or near the crest of the southern Sierra Nevada (CNPS 2011). The largest known population, with several thousand individuals, occurs on Spanish Needle Peak (Pitzer 2010). The nearest known location is 8 mi west of the Project area near upper Horse Canyon about 4 miles upstream from Sand Canyon (CNDDB 2011).

No suitable talus slope habitats for Spanish Needle onion occur in the Project area, and the species is unlikely to occur. Surveys conducted by GANDA in May, during the flowering period (April – June), failed to detect the species.

California androsace (*Androsace elongata* ssp. *acuta*)

California androsace is a white-flowered annual herb in the Primrose Family (Primulaceae). It is the only subspecies of *Androsace elongata* known to occur in California (USFS 2005). It is found in Grassland,

Chaparral, Coastal Sage Scrub, Semi-Desert Shrub, Pinyon and Juniper Woodland, and Cismontane Woodland communities at elevations of 1,000 to 3,940 feet (CNPS 2011). It typically occurs where vegetation cover is low and mesic conditions are present, such as on and adjacent to moss-covered soil or rock outcrops on north-facing slopes or along rocky washes (USFS 2005). It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, California androsace has been found in many counties throughout the state. The nearest known location is 20 mi west of the Project area in the Tehachapi Mountains near Keene Station (CCH 2011).

There is only marginally suitable habitat for California androsace in the Project area. Botanical surveys conducted by GANDA during the flowering period of California Androsace (March to June) did not detect the subspecies within the Project area. However, the subspecies is small and inconspicuous, and it is possible, but unlikely, that it occurs within the Project area.

Horn's milk-vetch (*Astragalus hornii var. hornii*)

Horn's milk-vetch is an annual herb in the Pea family (Fabaceae) found in Meadow and Seep and Playa communities. It is often associated with lake margins and alkaline substrates. It ranges in elevation from 200 to 2,790 feet (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 1B.1, indicating that it is rare, threatened or endangered in California and elsewhere, with a high threat level in California (ibid.).

In California, Horn's milk-vetch has been found in Inyo, Kern, San Bernardino, and Tulare counties. It is also know to occur in Nevada (CNPS 2011). The nearest known location is 15 mi south of the Project area in Willow Springs. (CNDDB 2011).

No suitable mesic alkaline habitats for this species occur in the Project area. The species was not observed in surveys conducted just prior to its flowering period, and no unidentified vegetative *Astragalus* species were observed.

Alkali mariposa-lily (*Calochortus striatus*)

Alkali mariposa lily is a bulbiferous herb in the Lily family found on mesic alkaline substrates within Chaparral, Chenopod Scrub, and Mojave Desert Scrub communities. It is often associated with meadows, seeps and alkali flats. Known occurrences range in elevation from 200 to 5,300 feet. It has no State or Federal listing status, but is included on CNPS List 1B.2, indicating that it is rare, threatened or endangered in California and elsewhere, and fairly endangered in California.

In California, alkali mariposa has been found in Kern, Los Angeles, and San Bernardino and Tulare counties. This species is also known to occur in southern Nevada (CNPS 2011). The nearest known location is 12 mi south of the Project area along Sierra Highway between Sopp Road and Backus Road (CNDDB 2011).

It is unlikely that alkali mariposa lily would occur on the Project area. There are no large alkali flats, seeps or meadows within the Project area, however some of the washes may provide marginal habitat for this species. No occurrences of this species were observed during botanical surveys conducted by GANDA during the flowering period for this species, April to June. Only the common desert mariposa lily (*Calochortus kennedyi*) was observed within the Project area. Alkali mariposa lily can be distinguished in the field from other *Calochortus* species by the distinctive purple veins on the otherwise light pink petals.

Kern County evening-primrose (*Camissonia kernensis* ssp. *kernensis*)

Kern County evening-primrose is an annual herb in the Evening Primrose family (Onagraceae) with small, but conspicuous four petaled yellow flowers. It is typically found in Chaparral, Joshua Tree Woodland, and Pinyon and Juniper Woodland on sandy or gravelly substrates (CNPS 2011). It ranges in elevation from 2,607 to 7,029 feet. It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list.

In California, Kern County evening-primrose is endemic to Kern and Santa Barbara counties (CNPS 2011). In Kern County, most documented occurrences of this subspecies occur in the Scodie Mountain's of the southern Sierra Nevada's near Walker Pass. The nearest known location is 4 mi south of the Project area about 3 miles west of Hwy 14 on Oak Creek Drive (CCH 2011).

Although suitable habitat is present in the Project area within Joshua Tree Woodland, botanical surveys conducted by GANDA during the flowering period of Kern County evening-primrose (March to May) did not detect the subspecies within the Project area. Only the more common species, Booth's evening primrose (*Camissonia boothii*), brown eyes (*Camissonia claviformis*), Mojave suncup (*C. campestris*), Palmer's evening primrose (*C. palmeri*), and pale yellow suncup (*C. pallida*) were observed.

White pygmy-poppy (*Canbya candida*)

White pygmy-poppy is a diminutive annual herb in the Poppy family (Papaveraceae) with small white flowers. It is typically found on gravelly, sandy, and granitic substrates in Joshua Tree Woodland, Mojavean Desert Scrub, and Pinyon and Juniper Woodland from 1,900 to 4,800 ft. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, white pygmy-poppy is known from Imperial, Inyo, Kern, Los Angeles, and San Bernardino counties (CNPS 2011). The nearest known location is 4 mi east of the Project area 2 miles north of Mojave. (CNDDB 2011).

Although suitable habitat for white pygmy-poppy occurs in the Project area within Joshua Tree Woodland, and Creosote Bush Scrub, botanical surveys conducted by GANDA during the flowering period (March to June) did not detect the species. White pygmy-poppy is the only species in the genus *Canbya*, and no similar species were observed.

Mojave paintbrush (*Castilleja plagiotoma*)

Mojave paintbrush is a hemiparasitic perennial herb in the Figwort family (*Scrophulariaceae*). It reaches 40 inches in height, and produces multiple stalks of inconspicuous yellow-green flowers that bloom from April to June (Hickman 1993, CNPS 2011). It is found in Great Basin Scrub, Joshua Tree Woodland, Lower Montane Coniferous Forest, and Pinyon and Juniper Woodland communities, often on alluvial soils (CNPS 2011). It is reported at elevations ranging from 900 to 8,000 feet (ibid.). Mojave paintbrush has no State or Federal listing status, but is included on CNPS List 4.3, a watch list (ibid.).

Mojave paintbrush is endemic to California, and has been reported in Los Angeles, San Bernardino, San Luis Obispo, Kern, Santa Barbara, San Benito, Fresno, Ventura, and Riverside counties (CCH 2011). This species has been observed by GANDA to occur in the greater AOCM Project area, but does not occur in the current project.

Although suitable habitat for Mojave paintbrush occurs in the Project area within Joshua Tree Woodland, California Juniper Woodland, and Creosote Bush Scrub, botanical surveys conducted by GANDA during the flowering period did not detect the species.

Death Valley sandmat (*Chamaesyce vallis-mortae*)

Death Valley sandmat is a perennial prostrate herb in the Spurge family (Euphorbiaceae). It is typically found in Mojavean Desert Scrub habitats on sandy or gravelly substrates (CNPS 2011). Known occurrences range in elevation from 760 to 4,800 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, Death Valley sandmat is known from Inyo, Kern, and San Bernardino counties in the Mohave Desert (CNPS 2011). The closest known location to the Project area is near the Kelso Valley about 15 miles northeast of the Project area (E. Kentner pers. obs.)

Although suitable habitat for Death Valley sandmat occurs in the Project area within Creosote Bush Scrub, botanical surveys conducted by GANDA outside of the flowering period of Death Valley sandmat (May to October) did not detect the species within the Project area. This species was observed to be easily detectable at a reference population located about ten miles north of the Project area on May, 3, 2011. Only the common species white margin sandmat (*Chamaesyce albomarginata*) was observed in the Project area.

Mojave spineflower (*Chorizanthe spinosa*)

Mojave spineflower is an annual herb in the Knotweed family (Polygonaceae) that has inconspicuous flowers that are only 3 mm long. There are generally five bracts per flower, with one bract much longer than the others. It is typically found in Chenopod Scrub, Joshua Tree Woodland, and Mojavean Desert Scrub habitat. (CNPS 2011). Known occurrences range in elevation from 20 to 4,290 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, Mojave spineflower is endemic the west Mohave Desert within Kern, Los Angeles, and San Bernardino counties (CNPS 2011). The nearest known location is 5 mi southeast of the Project area in Mohave (CCH 2011).

Only marginal habitat for Mojave spineflower occurs in the Project area on moderately alkaline soils. Botanical surveys conducted by GANDA during the flowering period of Mojave spineflower, March to July, did not detect the species within the Project area. Only the more common species, brittle spineflower (*Chorizanthe brevicornu*) and fivetooth spineflower (*C. watsonii*) were observed.

Kern Canyon clarkia (*Clarkia xantiana* ssp. *parviflora*)

Kern Canyon clarkia is an annual herb in the Evening Primrose family with conspicuous four petaled pink flowers that are notched at the tip. It is typically found in Chaparral, Cismontane Woodland, Great Basin Scrub, and Valley and Foothill Grassland habitats, often on sandy, sometimes rocky slopes (CNPS 2011). It ranges in elevation from 2,310 to 11,950 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, Kern Canyon clarkia is endemic to Inyo, Kern, Los Angeles, and Tulare counties (CNPS 2011). In Kern County, all known occurrences of this subspecies occur in the southern Sierra Nevada. The nearest known location is 26 mi northwest of the Project area about 2 mi west of Kelso Valley Road, off of the road to Piute Mountain (CNDDB 2011).

Very little marginally suitable habitat for this species is present in the Project area. Botanical surveys conducted by GANDA during the flowering period of Kern Canyon clarkia (May to June) did not detect the subspecies within the Project area. No *Clarkia* species were observed during the surveys.

Short-bracted bird's-beak (*Cordylanthus rigidus* ssp. *brevibracteatus*)

Short-bracted bird's-beak is a many branched annual species in the Figwort family that is found in the southern Sierra Nevada floristic province (Hickman 1993). It occurs in the understory and in granitic openings within Chaparral, Lower and Upper Montane Coniferous Forest, Pinyon and Juniper Woodland vegetation communities at elevations between 3,000 and 7,000 feet (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list.

Short-bracted bird's beak is endemic to California. It has been reported to occur in Kern, Tulare, Fresno and Mariposa counties. The nearest known location is 12 mi west of the Project area in Antelope Canyon south of Tehachapi (CCH 2011).

Little suitable habitat for short-bracted bird's beak occurs in the Project area. Surveys conducted by GANDA from April to May did not detect any *Cordylanthus* species. Although, short-bracted bird's beak blooms from July to August, vegetative individuals would have been detectable at the time of the surveys. It can be can be distinguished from the common rigid bird's beak (*Cordylanthus rigidus* ssp. *rigidus*) by the conspicuously shorter length of the flower bracts subtending the flowers as compared to flower bracts that are as large or larger than the flowers (Hickman 1993).

Mojave tarplant (*Deinandra mohavensis*)

Mojave tar plant is an annual tar plant in the Sunflower family with sessile clusters of small yellow flowers. It grows to a height of approximately 36 inches tall, and is typically found in Chaparral, Coastal Scrub, Riparian Scrub and mesic community types, in washes or around springs at elevations between 1,800 and 4,000 feet (CNPS 2011). It is State listed and Endangered, has no Federal listing status, and is included on CNPS List 1B.3, indicating that it is rare, threatened or endangered in California and elsewhere, but not very endangered in California.

In California, Mojave tar plant is known to occur in Kern, San Bernardino, Riverside, and San Diego counties. The closest known occurrence of Mojave tar plant is over 20 miles north of the Project area near a spring on Mount Cross in Jawbone Canyon (CCH 2011). There are other known occurrences in Kelso Valley, over 20 miles north of the Project area. These occurrences were found in drainages and on low hillslopes near drainages on granitic substrate within a recent burn (CCH 2011).

No suitable vernally moist habitat for this species occurs on the Project area. Botanical surveys conducted by GANDA in late May did not detect any species of the genus on the Project area. Although the flowering time for Mojave tar plant is from June to September, vegetative individuals of Mojave tarplant were abundant and easily detectable at a nearby reference population one week prior to the surveys.

Gypsum-loving larkspur (*Delphinium gypsophilum* ssp. *gypsophilum*)

Gypsum-loving larkspur is a showy 15 to 40 inch tall perennial larkspur in the Buttercup family with a central stalk of dense white flowers. Habitat for the species includes Chenopod Scrub, Cismontane Woodland and Valley and Foothill Grassland plant community types (CNPS 2011) at elevations up to 6,000 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

Gypsum-loving larkspur is endemic to California and has been reported in Alameda, Fresno, Kings, Kern, Madera, Merced, Monterey, San Benito, San Joaquin, San Luis Obispo, Stanislaus, and Ventura counties. It is reported to occur in the Southern Sierra and Tehachapi Floristic provinces. The occurrences of gypsum-loving larkspur in the Tehachapi area are on open hill slopes often associated with "light colored soils", most likely derived from calcareous substrates (CCH 2011). The nearest known location is 3 mi west of the Project area on the north slope of Tehachapi Pass (CCH 2011).

Potential habitat for gypsum-loving larkspur is present within the Project area, but the species was not found during surveys conducted by GANDA during the flowering period from February to May. Only one other larkspur species was found in the Project area, desert larkspur (*Delphinium parishii*). Gypsum-loving larkspur can be distinguished from the other larkspur species of the region by its pinkish white flowers, as compared to the lighter blue flowers of desert larkspur (Hickman 1993).

Mt. Pinos larkspur (*Delphinium parryi* ssp. *purpureum*)

Mt. Pinos larkspur is a 10 to 36 inch tall perennial larkspur in the Buttercup family (Ranunculaceae) with one to several flowering stalks of deep purple to light blue flowers. It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list. It is found within the Chaparral, Mojavean Desert Scrub, Pinyon and Juniper Woodland plant community types at elevations between 3,000 and 8,000 feet (CNDDB 2011).

Mt. Pinos larkspur is endemic to California and is reported to occur in Kern, Santa Barbara and Ventura counties. It is likely that this species is more wide spread than reported, as it was observed to occur in the greater ACOM Project area in surveys conducted in 2010. There are many records of *Delphinium parryi* near the Project area for which the subspecies is not noted (CCH 2011).

Only marginally suitable habitat for this species occurs within the Project survey area, and only the closely related common species desert larkspur (*Delphinium parishii*) was observed during the surveys. However, the surveys were conducted prior to the flowering period of Mt. Pinos larkspur, and additional surveys for this species are planned.

Limestone dudleya (*Dudleya abramsii ssp. calcicola*)

Limestone dudleya is a perennial herb in the Stonecrop family (Crassulaceae) with fleshy leaves in a basal rosette. It is typically found in Chaparral and Pinyon and Juniper Woodland on carbonate substrates (CNPS 2011). It ranges in elevation from 1,640 to 8,528 feet. It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list.

Limestone dudleya is endemic to California and has been found in Inyo, Kern, and Tulare counties (CNPS 2011). The nearest known location is 17 mi northwest of the Project area about 1.5 mi north of Twin Oaks in the southern Piute Mtns (CCH 2011).

Although suitable habitat for this species is present in the Project area, botanical surveys conducted by GANDA during the flowering period of limestone dudleya (April to August) did not detect the species within the Project area. No species of this genus were observed.

Hoover's eriastrum (*Eriastrum hooveri*)

Hoover's eriastrum is an annual herb in the Phlox family (Polemoniaceae) found in Chenopod Scrub, Pinyon and Juniper Woodland, and Valley and Foothill Grassland communities (CNPS 2011). It ranges in elevation from 160 to 3,000 feet (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, Hoover's eriastrum has been found in Fresno, Kings, Kern, Los Angeles, Santa Barbara, San Benito, and San Luis Obispo counties and is considered a Californian endemic. The nearest known location is 22 mi south of the Project area on the southwest edge of Rosamond Dry Lake (CCH 2011).

Marginally suitable habitat for this species is present in the Project area, but the species was not observed in surveys conducted during the flowering period.

Tracy's eriastrum (*Eriastrum tracyi*)

Tracy's eriastrum is an annual species in the Phlox family that is up to 20 cm in height with small, generally blue flowers. It is primarily known to occur in Chaparral and Cismontane vegetation types, at elevations between 1,040-3,220 feet (CNPS 2011). Tracy's eriastrum has recently been resurrected as a species (Gowen 2008). It was first described by Mason (1945), and later combined with Brandegee's eriastrum in the Jepson manual (Hickman 1993). It is State listed as rare, has no Federal listing status, and is included on CNPS List 1B.2, indicating that it is rare, threatened or endangered in California and elsewhere, and fairly endangered in California.

Recent investigations of herbarium records have determined that six records of Great Basin woollystar (*E. sparsiflorum*) within Kern County are actually Tracy's eriastrum. The nearest known location is 12 mi north of the Project area about 1.5 miles northeast of Emerald Mountain (CNDDB 2011).

Although suitable habitat is present in the Project area, botanical surveys conducted by GANDA did not detect Tracy's eriastrum. Two other *Eriastrum* species were detected, many flowered eriastrum (*E. pluriflorum*), which can be distinguished from Tracy's eriastrum by its exserted stamens, and giant woollystar (*E. densifolium*) a perennial species easily distinguishable from the annual Tracy's eriastrum.

White-flowered rabbitbrush (*Ericameria albida*)

White-flowered rabbitbrush is a perennial shrub in the Sunflower family, with white flowers and green, gland dotted herbage (Hickman 1993). It is associated with Chenopod Scrub and Alkaline Playa plant community types, often around meadows and seeps at elevations between 900 and 6,000 feet (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

White-flowered rabbitbrush is found in Utah, Nevada and California and is locally rare in California. It has only been reported in Inyo, Kern, Mono and San Bernardino counties. The nearest known location is 50 mi northeast of the Project area in Indian Wells Valley (CCH 2011).

White-flowered strongly associated with alkaline soils and would not be expected to occur out of this habitat (Hickman 1993). Suitable habitat is present on the Project area in a few alkaline areas, but this habitat is very limited and it is unlikely that this species would occur. White-flowered rabbitbrush can be distinguished from other species of rabbitbrush by its distinctive white flowers that bloom from June to November. Four other species of *Ericameria* (=*Chrysothamnus*) were found on the Project area.

Kern buckwheat (*Eriogonum kennedyi* var. *pinicola*)

Kern buckwheat is a perennial mat forming buckwheat in the Knotweed family. It occurs in Chaparral and Pinyon and Juniper Woodland at elevations between 6,000 ft and 6,100 ft (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 1B.1, indicating that it is rare, threatened or endangered in California and elsewhere, and seriously endangered in California.

Kern buckwheat is only known from Sweet Ridge and Pine Tree Canyon in Kern County, California (CCH 2011). Sweet Ridge is located approximately 14 mi northeast of the Project area. Pine Tree Canyon is located approximately 12 miles north of the Project area.

No suitable habitat for this species is present in the Project area, and botanical surveys conducted by GANDA outside of the flowering period (May to June) did not detect the species. The only perennial *Eriogonum* species observed were Eastern Mojave buckwheat (*E. fasciculatum* var. *polifolium*), yucca buckwheat (*E. plumatella*), and Heerman's buckwheat (*E. heermannii*). None of the observed perennial species have a growth form similar to Kern buckwheat.

Barstow woolly sunflower (*Eriophyllum mohavense*)
Barstow woolly sunflower is an annual herb 1-2 inches tall in the Sunflower family. It is typically found in Chenopod scrub, Mojavean desert scrub and Playas from 1,600 to 3,200 ft in elevation (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 1B.2, indicating that it is rare, threatened or endangered in California and elsewhere, and fairly endangered in California.

In California, the Barstow woolly sunflower is known from Fresno, Kern, Los Angeles, and San Bernardino counties (CNPS 2011). The nearest occurrence to the Project area is approximately 20 miles to the east on Edwards Air force Base. This occurrence was found on clay swales and abraded areas within Chenopod scrub (CCH 2011).

Marginal habitat for Barstow woolly sunflower occurs in the Project area, but the species is not known to occur west of Edwards Air Force Base. Barstow woolly sunflower was not observed during the botanical inventory conducted by GANDA during the flowering period (March to May).

Inland gilia (*Gilia interior*)
Inland gilia is an annual herb in the Phlox family with small purple flowers with yellow throats. It is typically found in Cismontane Woodland, Joshua Tree Woodland, and Lower Montane Coniferous Forest on rocky substrates (CNPS 2011). Known occurrences range in elevation from 2,296 to 5,576 feet. It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list.

In California, inland gilia is endemic to Kern and Tulare counties (CNPS 2011). The nearest known location is 23 mi south of the Project area west of Lancaster at 125th St. and Hwy 138 (CCH 2011).

Although suitable habitat is present in the Project area within Joshua Tree Woodland, botanical surveys conducted by GANDA during the flowering period of inland Gilia (March to May) did not detect the species. Several more widespread species on *Gilia* were observed.

Cuyama gilia (*Gilia latiflora ssp. Cuyamensis*)
Cuyama gilia is an annual herb in the Phlox family (Polemoniaceae) found in Pinyon and Juniper Woodland communities. It is often associated with sandy substrates (CNPS 2011). It ranges in elevation from 1,970 to 6,560 feet (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list.

In California, Cuyama gilia has been found in Kern, Los Angeles, Santa Barbara, San Luis Obispo, and Ventura counties (CNPS 2011). The nearest known location is 33 mi south of the Project area in the vicinity of Ritter Ridge on the south side of the Antelope Valley (CCH 2011).

Although suitable habitat is present in the Project area, botanical surveys conducted by GANDA during the flowering period of Cuyama Gilia (April to June) did not detect the species. Several more widespread species on *Gilia* were observed.

Golden goodmania (*Goodmania luteola*)
Golden goodmania is a small, spreading annual herb in the Knotweed family that is thinly hairy throughout and has small yellow flowers. It is typically found in Mojavean Desert Scrub, Meadows and Seeps, Playas, and Valley and Foothill Grassland on alkaline or clay substrates (CNPS 2011). Known occurrences range in elevation from 65 to 7,216 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, golden goodmania has been found in Fresno, Inyo, Kern, Los Angeles, Madera, Mono, and Tulare counties (CNPS 2011). The nearest known location is 21 mi east of the Project area 8 mi north of Muroc (CCH 2011).

Marginal habitat for golden goodmania occurs in the Project area, but botanical surveys conducted by GANDA during the flowering period of golden goodmania (April to August) did not detect the species within the Project area. No similar species were observed.

Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*)

Coulter's goldfields is an annual herb in the Sunflower family with yellow-orange flowers. It is typically found in Coastal Salt Marshes and Swamps, Playas, and Vernal Pools, often in saline environments (CNPS 2011). It ranges in elevation from sea level to 4,000 feet. It has no State or Federal listing status, but is included on CNPS List 1B.1, indicating that it is rare, threatened or endangered in California and elsewhere, and seriously endangered in California.

In California, Coulter's goldfields has been found in Colusa, Kern, Los Angeles, Merced, Orange, Riverside, Santa Barbara, San Bernardino, San Diego, San Luis Obispo, Tulare, and Ventura counties (CNPS 2011). The nearest known location is 12 mi west of the Project area in Tehachapi (CNDDB 2011).

Only a small amount of marginally suitable habitat for Coulter's goldfields is present within the Project area. Botanical surveys conducted by GANDA during the flowering period of Coulter's goldfields, (February to June) did not detect the species. Only the common California goldfields (*L. californica*) was observed within the Project area during surveys. This species is distinguished from Coulter's goldfields by having free phyllaries and hairy leaves.

Sagebrush loeflingia (*Loeflingia squarrosa var. artemisiarum*)

Sagebrush loeflingia is an annual herb in the Pink family (Caryophyllaceae) that is generally under 7 cm tall. It is typically found in desert Dunes, Great Basin Scrub, and Sonoran Desert Scrub in sandy habitats (CNPS 2011). Known occurrences range in elevation from 2,310 to 5,330 feet. It has no State or Federal listing status, but is included on CNPS List 2.2, indicating that it is rare, threatened or endangered in California, but more common elsewhere.

In California, sagebrush loeflingia is found in Inyo, Kern, Lassen , Los Angeles , Plumas, and San Bernardino counties. It is also found in Nevada, Oregon, and Wyoming (CNPS 2011). The nearest known location is 10 mi southeast of the Project area northeast of Acton (CNDDB 2011).

Although marginally suitable habitat is present in the Project area, botanical surveys conducted by GANDA during the flowering period of sagebrush Loeflingia (April to May) did not detect the species. No similar-appearing species were observed.

Solitary blazing star (*Mentzelia eremophila*)

Solitary blazing star is an annual herb in the Loasa family (Loasaceae). It is typically found in Mojavean Desert Scrub communities in canyons, washes, and on rocky slopes within the western Mojave Desert region (CNPS 2011). Known occurrences range in elevation from 2,310 to 4,025 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, solitary blazing star is endemic to Inyo, Kern, and San Bernardino counties (CNPS 2011). The nearest known location is 9 mi north of the Project area on the east side of Barren Ridge, about 7.5 mi northwest of California City (CCH 2011).

Although some suitable habitat is present in the Project area, botanical surveys conducted by GANDA during the flowering period of solitary blazing star (March to May) did not detect the species within the Project area. Only the widespread species whitestem blazingstar (*M. albicaulis*) and Veatch's blazingstar (*M. veatchiana*) were observed in the Project area. Solitary blazing star is readily distinguishable from the observed common species by its larger flower size (12-24 millimeters).

Sylvan microseris (*Microseris sylvatica*)

Sylvan microseris is a perennial herb in the Sunflower family. It is typically found in Chaparral, Cismontane Woodland, Great Basin Scrub, Pinyon and Juniper Woodland, and Valley and Foothill Grassland habitats (CNPS 2011). Known occurrences range in elevation from 150 to 4,950 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, sylvan microseris has a broad distribution, occurring in 20 counties from southern California to northern California, including the western Mojave Desert (CNPS 2011). The nearest known location is 12 mi west of the Project area in Tehachapi (CCH 2011).

Although some suitable habitat is present in the Project area, botanical surveys conducted by GANDA during the flowering period of sylvan Microseris (March to June) did not detect the species within the Project area. No species of *Microseris* were observed.

Calico monkeyflower (*Mimulus pictus*)

Calico monkeyflower is an annual herb in the Figwort family. It is typically found in Broadleafed Upland Forest and Cismontane Woodland habitats within granitic or disturbed areas (CNPS 2011). It ranges in elevation from 330 to 4,290 feet. It has no State or Federal listing status, but is included on CNPS List 1B.2, indicating that it is rare, threatened or endangered in California and elsewhere, and fairly endangered in California.

In California, calico monkeyflower is endemic to Kern and Tulare counties (CNPS 2011). The nearest known location is 6 mi northwest of the Project area near a tributary to Cache Creek/Sand Canyon, northeast of Monolith (CNDDB 2011).

No suitable habitat for this species occurs in the project area, and botanical surveys conducted by GANDA during the flowering period (March to May) did not detect the species. No species of monkeyflower were observed within the Project area.

Tehachapi monardella (*Monardella linoides* ssp. *oblonga*)

Tehachapi monardella is a perennial herb in the Mint family (Lamiaceae) with bracted heads of whitish, lavender, or pale purple flowers. Tehachapi monardella has no State or Federal listing status, but is included on CNPS List 1B.3, indicating that it is "rare, threatened or endangered in California and elsewhere", but is "not very endangered in California" (CNPS 2011).

Typical habitats include Lower Montane Coniferous Forest, Upper Montane Coniferous Forest, and Pinyon and Juniper Woodland, where it is found on dry slopes with decomposed granitic soils, and in roadside disturbed areas at elevations between 5,560 and 8,100 feet (CNDDB 2011). The nearest known location is 8 mi north of the Project area about 0.8 mi SE of Cache Peak (CCH 2011)

Botanical surveys conducted by GANDA prior to the flowering period of Tehachapi monardella (June to August) did not detect the species. Although the surveys were conducted outside of the flowering period, the species is a perennial and should have been easily detectable at the time of the surveys. This species has been documented to occur in the greater ACOM Project area, but only marginally suitable habitat exists within the Alta East botanical survey area.

Crowned muilla (*Muilla coronata*)

Crowned muilla is a small 3-15 cm tall bulbiferous herb in the Lily family. It typically occurs in Joshua Tree Woodland, Pinyon and Juniper Woodland, and Mojavean Desert Scrub, most often on barren flats and ridges in sandy, granitic soils (CNPS 2011; CNDDB 2011). Known occurrences range in elevation from 3280 to 5250 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

In California, crowned muilla is known from Inyo, Kern, Los Angeles, San Bernardino, and Tulare counties. The nearest known location is 7 mi west of the Project area off of Oak Creek Rd., 9 mi west of Mojave (CCH 2011).

Although suitable habitat is present in the Project area, botanical surveys conducted by GANDA during the flowering period (March to April) did not detect the species. No similar species were observed to occur within the Project area.

Piute Mountains navarretia (*Navarretia setiloba*)

Piute Mountains navarretia is an annual herb in the Phlox family. It is typically found in Cismontane Woodland, Pinyon and Juniper Woodland, and Valley and Foothill Grassland habitats in clay or gravelly loam substrates (CNPS 2011). Known occurrences range in elevation from 1,000 to 6,930 feet. It has no State or Federal listing status, but is included on CNPS List 1B.1, indicating that it is rare, threatened or endangered in California and elsewhere, and seriously endangered in California.

In California, Piute Mountains navarretia is endemic to Kern, Los Angeles, and Tulare counties (CNPS 2011). The nearest known location is 24 mi northwest of the Project area on Piute Mountain Road, <3 miles from the Caliente Bodfish Road (CNDDB 2011).

Although some suitable habitat is present in the Project area, botanical surveys conducted by GANDA during the flowering period of Piute Mountains Navarretia (April to July) did not detect the species within the Project area. No species of this genus were observed.

Slender threadplant (*Nemacladus gracilis*)

Slender threadplant is an annual herb in the Bellflower family (Campanulaceae). It is typically found in Cismontane Woodland and Valley and Foothill Grassland habitats on sandy or gravelly substrates (CNPS 2011). It ranges in elevation from 400 to 6,270 feet. It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list.

In California, slender threadplant is endemic to Fresno, Kings, Kern, Los Angeles, and Merced counties (CNPS 2011). The nearest known location is 9 mi west of the Project area in Oak Creek Canyon, 1.8 miles southwest of intersection of Oak Creek Rd and Tehachapi Willow Springs Rd (CCH 2011).

Although some suitable habitat is present in the Project area, botanical surveys conducted by GANDA during the flowering period of slender threadplant (March to May) did not detect the species within the Project area. Only the more widespread species eastern threadplant (*N. orientalis*) was observed.

Large-flowered nemacladus (*Nemacladus secundiflorus var. secundiflorus*)

Large-flowered nemacladus is an annual herb in the Bellflower family (Campanulaceae) found in Chaparral and Valley and Foothill Grassland communities. It ranges in elevation from 650 to 6,500 feet (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 4.32, a watch list.

In California, large-flowered nemacladus has been found in Kern, Monterey, San Luis Obispo, and Tulare counties (CNPS 2011). The nearest known location is 45 mi north of the Project area on Greenhorn Mountain (CCH 2011).

Although some suitable habitat is present in the Project area, botanical surveys conducted by GANDA during the flowering period of large-flowered nemacladus (April to June) did not detect the species within the Project area. Only the more widespread species eastern threadplant (*N. orientalis*) was observed.

Fragile pentachaeta *(Pentachaeta fragilis)*

Fragile pentachaeta is a diminutive 2 to 6-inch tall annual herb in the Sunflower family (*Asteraceae*). It has alternate leaves that are ciliate on the edges and yellow flower heads with 7-12 ray flowers (Hickman 1993). Fragile pentachaeta flowers from March to June (CNPS 2011). It grows in Chaparral, Foothill Grasslands and Lower Montane Coniferous Forest communities, in loose sandy or loamy soils (CNPS 2011, Hickman 1993). Known occurrences of fragile pentachaeta range in elevation from 100 to 7,000 feet. Fragile pentachaeta has no State or Federal listing status, but is included on CNPS List 4.3, a watch list (CNPS 2011).

Fragile pentachaeta is endemic to California, and has been reported in Kern, Madera, Merced, Monterey, Santa Barbara, San Luis Obispo, Tuolumne, Ventura and Los Angeles counties (CNPS 2011). The nearest known location is 17 mi north of the Project area in the Kelso Valley (CCH 2011).

Although marginally suitable habitat for this species is present in the Project area, the species was not observed during botanical surveys conducted by GANDA during the flowering period. No similar species were observed.

Hubby's phacelia (*Phacelia cicutaria* var. *hubbyi*)

Hubby's phacelia is a 5 to 30 inch tall annual herbaceous plant in the Waterleaf family with white to lavender colored flowers clustered in dense cymes (Hickman 1993). It is typically found in Chaparral, Coastal Scrub and Valley and Foothill Grassland plant community types, most often on gravelly, rocky, and talus slopes (CNPS 2011; Hickman 1993). It ranges in elevation from sea level to 3,300 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

Hubby's phacelia is endemic to California and has been reported to occur in Los Angeles, Ventura, Santa Barbara, Kern and Orange counties (CNPS 2011). The nearest known location is 17 mi north of the Project area near Jawbone canyon (CCH 2011).

Although suitable habitat for this species is present in the Project area, the species was not observed during botanical surveys conducted by GANDA during the flowering period (April to June). Several other species of *Phacelia*, including distant phacelia (*Phacelia distans*), which has shorter straight calyx lobes, were observed on the Project area. Hubby's phacelia can be distinguished from other varieties of caterpillar phacelia (*P. cicutaria*) by its continuously dense inflorescence and by the shaggy/wavy hairs on the calyx or outer flower parts.

Transverse Range phacelia (*Phacelia exilis*)
Transverse Range phacelia is a lavender-flowered annual herb in the Waterleaf family, found in Lower and Upper Montane Coniferous Forest communities. It is often associated with meadows, seeps, pebble plains, and sandy and gravelly substrates. It ranges in elevation from 3,630 to 8,910 feet (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list (ibid.).

Transverse Range phacelia is endemic to California, where it has been found in Kern, Los Angeles, San Bernardino, Tulare, and Ventura counties (CNPS 2011). The nearest known location is 24 mi northwest of the Project area to the southeast of Piute Peak (CCH 2011).

No suitable habitat for Transverse Range phacelia is present in the Project area and it is unlikely this species occurs there. It was not detected in botanical surveys conducted by GANDA during the flowering period of this species (May to August). Several other *Phacelia* species observed in the study area (Appendix A). Transverse Range phacelia can be distinguished from the other *Phacelia* species observed in the Project area by flower color, growth form, or seed characteristics.

Charlotte's phacelia (*Phacelia nashiana*)
Charlotte's phacelia is an annual herbaceous plant in the Waterleaf family. It is typically found on granitic, rocky or sandy substrates in Joshua Tree Woodland, Mojavean Desert Scrub, and Pinyon and Juniper Woodland. Known occurrences range in elevation from 1,900 to 7,300 feet. It has no State or Federal listing status, but is included on CNPS List 1B.2, indicating that it is rare, threatened or endangered in California and elsewhere, and fairly endangered in California.

In California, Charlotte's phacelia is known from Inyo, Kern, and Tulare counties (CNPS 2011). The nearest known location is 9 mi northeast of the Project area on an east slope of Barren Ridge, about 4.5 miles southwest of the mouth of Pine Tree Canyon (CNDDB 2011).

Although suitable habitat for this species is present in the Project area, the species was not observed during botanical surveys conducted by GANDA during the flowering period (March to June). Several other *Phacelia* species observed in the study area (Appendix A). Charlotte's phacelia can be distinguished from the observed *Phacelia* species by its larger bright blue flowers.

Mojave indigo-bush (*Psorothamnus arborescens* var. *arborescens*)
Mojave indigo-bush is a perennial shrub in the Pea family that grows up to 3.5 feet tall and has deep purple or indigo flowers and ½ inch long gland dotted fruits (Hickman 1993). It is typically found in Mojavean Desert Scrub and Riparian Scrub plant community types on stony flats and granitic bedrock (CNPS 2011). It has been reported to occur at elevations between 1,200 and 4,000 feet (CCH 2011; CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 4.3, a watch list.

In California, Mojave indigo-bush has been reported from Kern, Inyo, and San Bernardino counties and also in the Sonora desert in Mexico (CNPS 2011). The nearest known location is 24 mi north of the Project area in Red Rock Canyon (CCH 2011).

Although suitable habitat for this species is present in the Project area within Creosote Bush Scrub, the species was not observed during botanical surveys conducted by GANDA during the flowering period (April to May). No species of *Psorothamnus* were observed during the surveys.

Mojave fish-hook cactus (*Sclerocactus polyancistrus*)
Mojave fish-hook cactus is a small cylindrical (4-12 inch tall by 2-3 inch wide), unbranched, cactus with clusters of 9-11 hooked spines and rose to magenta colored flowers (Hickman, 1993). It is typically

found in Joshua Tree Woodland, Great Basin Scrub, and Mojavean Desert Scrub plant community types on well-drained soil, rocky gravelly mesas, slopes and outcrops, often of calcareous substrate (CNPS 2011). It has been reported to occur at elevations between 1,800 and 7,500 feet. It has no State or Federal listing status, but is included on CNPS List 4.2, a watch list.

Mojave fish-hook cactus has been reported in the following California counties; Inyo, Kern, and San Bernardino (CNPS 2011). The nearest known location is 25 mi north of the Project area in Red Rock Canyon (CCH 2011).

Although suitable habitat for this species is present in the Project area within Creosote Bush Scrub and Joshua Tree Woodland, the species was not observed during botanical surveys conducted by GANDA during the flowering period (April to July). No species of *Sclerocactus* were observed during the surveys.

Piute Mountains jewel-flower (*Streptanthus cordatus* var. *piutensis*)

Piute Mountains jewel-flower is a 6 inch to 2.5 foot tall perennial herbaceous plant in the Mustard family (Brassicaceae) with clusters of thick obovate basal leaves, and clasping lanceolate upper leaves with few to many stalks of ½ inch long purple flowers that can have green or yellow sepals or outer petals (Hickman, 1993). Piute Mountains jewel-flower is known to occur in Broadleafed Upland Forests, Closed-Cone Coniferous Forest, and Pinyon and Juniper Woodland plant community types along roadbanks, cliffs, rock outcrops, and sometimes on metamorphic-red clay soils. Known occurrences range in elevation from 1,000 to 6,500 feet (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 1B.2, indicating that it is rare, threatened or endangered in California and elsewhere, and fairly endangered in California.

Piute Mountains jewel-flower is endemic to California and has only been reported in Kern County. The nearest known location is 7 mi northwest of the Project area on Sweetwater Ridge southeast of Cache Peak (CNDDB 2011).

Only marginally suitable habitat for this species is present in the Project area, and the species was not observed during botanical surveys conducted by GANDA during the flowering period (May to July). No species of *Streptanthus* were observed during the surveys.

Golden violet (*Viola purpurea* ssp. *aurea*)

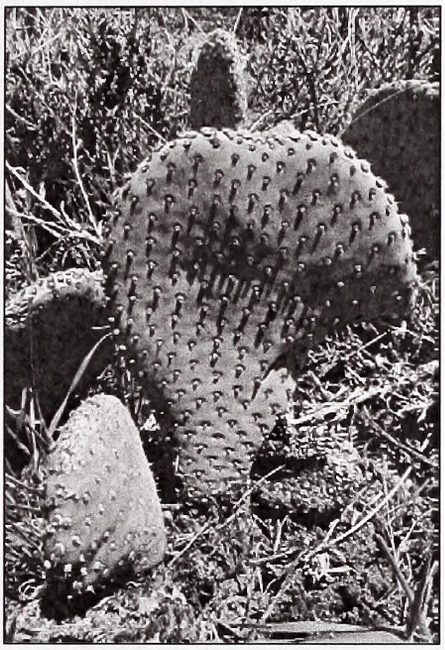
Golden violet is a perennial herb in the Violet family (Violaceae) with golden yellow flowers. It is typically found on sandy substrates in Great Basin Scrub and Pinyon and Juniper Woodland habitats. Known occurrences range in elevation from 3,200 to 6,700 feet (CNPS 2011). It has no State or Federal listing status, but is included on CNPS List 2.2, indicating that it is rare, threatened or endangered in California, but more common elsewhere.

In California, golden violet is known is known to occur in Kern, Lassen, Los Angeles, Mono, San Bernardino, San Diego, and Sierra counties. This species is also known to occur in Nevada (CNPS 2011). There are only two CNDDB occurrence records for this species in Kern County, an older record from "Mojave Station", and another from the Temblor Range on the western side of the San Joaquin Valley, more than 70 miles from the Project area.

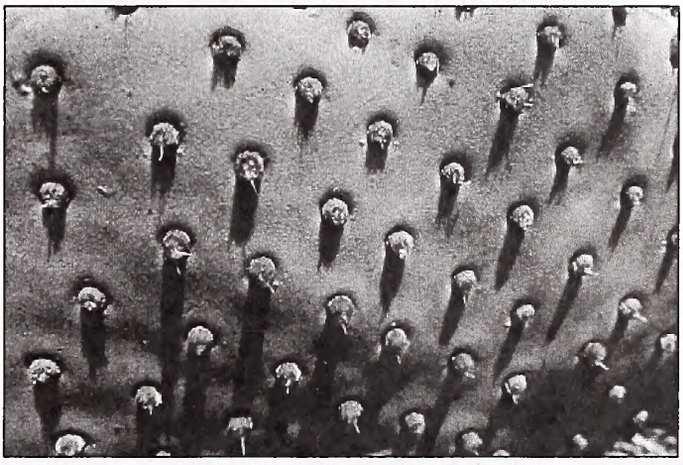
No suitable habitat for this species is present in the Project area, and the species was not observed during botanical surveys conducted during the flowering period of April to June.

Appendix F

Representative photographs



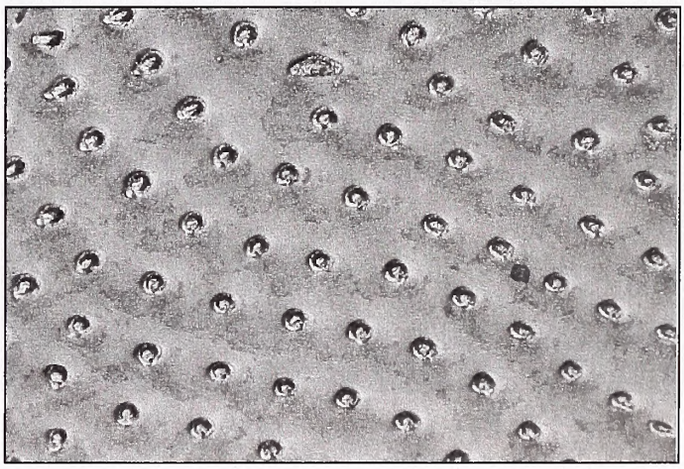
Bakersfield cactus



Bakersfield cactus



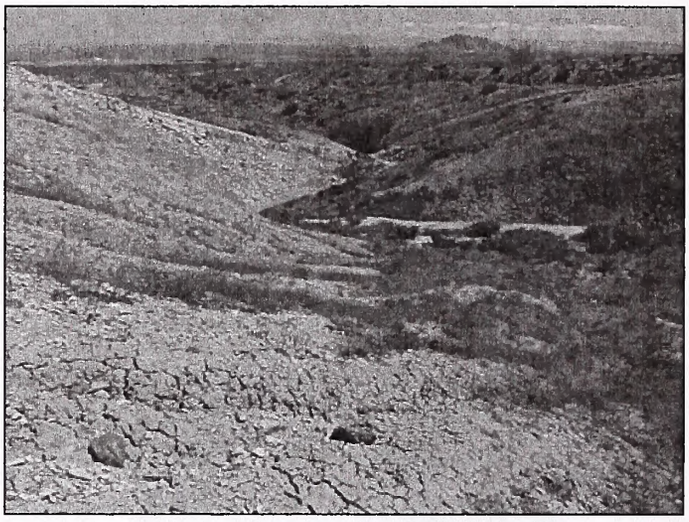
Beavertail cactus



Beavertail cactus



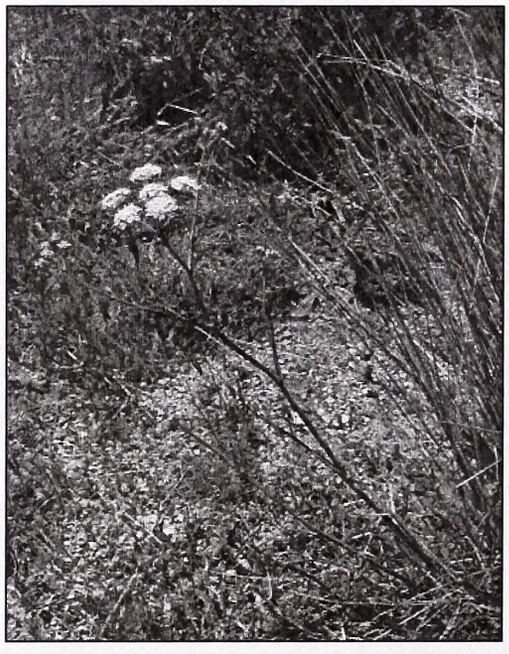
Pale-yellow layia



Pale-yellow layia habitat



Pale-yellow layia habitat



Adobe yampah

Appendix D-28

Jurisdictional Wetlands

Jurisdictional Wetlands and Other Waters—Alta East Wind Energy Project

PREPARED FOR: Randy Jenks, Alta Windpower Development, LLC

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DATE: July 11, 2011

This memorandum describes jurisdictional wetlands and other waters that are present at Alta East Wind Energy Project site and a proposed offsite transmission line connecting the project site to adjacent existing Alta Windpower Development, LLC (AWD) projects. This evaluation is based on a desk-top review, field delineation of jurisdictional features, and experience with other projects in the vicinity.

The project location is shown on Figures 1 and 2. The U. S. Geological Survey National Hydrography Dataset (NHD) blue-line streams are classified as intermittent; these are shown on Figure 2. Additionally, the National Wetland Institute (NWI) has mapped riverine wetlands on Cache Creek, near the project site (Figures 2 and 3).

The project is located in the southwestern portion of the South Lahontan Hydrologic Region (HR). Within the South Lahontan HR, the project straddles the Antelope Hydrologic Unit (HU) and the Fremont HU (see Figure 3). Runoff from the majority of the site flows southeasterly toward Rogers Dry Lake and Rosamond Dry Lake (Figure 3), and infiltrates in soils of the bajada. In some areas, the Los Angeles aqueduct may provide a hydrologic barrier to offsite runoff.

Federal and state laws and regulations that are applicable to wetlands and other waters, methodology used to delineate jurisdictional features, and preliminary review of results are provided in the following sections.

1.0 Overview of Applicable Regulations

1.1 Federal Regulations

Federal Clean Water Act

The CWA seeks to restore and maintain the chemical, physical, and biological integrity of the nation's water. The CWA sets up a system of water quality standards, discharge limitations, and authorization requirements. Authorizations associated with Sections 401 and 404 of the CWA (described below) may be required where waters of the U.S. would be affected by projects.

- Section 401—Section 401 of the CWA (governed by 33 United States Code [USC] 1341) and 40 Code of Federal Regulations (CFR) 121 requires a Water Quality Certification

from the State Water Resources Control Board (State Board) or Regional Water Quality Control Board (RWQCB) when a project (1) requires a federal license or permit (such as a Section 404 permit), and (2) will result in a discharge to waters of the U.S. The certification may be conditioned. Project activities that typically result in a discharge subject to Section 401 Water Quality Certification are the construction and subsequent operation of a facility.

- Section 404—Activities that have the potential to discharge fill materials into waters of the U.S., including adjacent wetlands, are regulated under Section 404 of the CWA, governed by 33 USC 1344 and 33 CFR 323, and administered by USACE. Fill activities may be permitted by a Nationwide or Individual Permit. The Nationwide Permit (NWP) Program involves certain activities that have been pre-authorized by USACE because USACE has determined that such activities would have minimal individual and cumulative adverse effects on the aquatic environment. The Individual Permit (IP) program applies to projects that do not meet the significance thresholds or general permit conditions of the NWP program. Under Section 404 (b)(1) guidelines, permittees are allowed to discharge dredged or fill material into the aquatic system only if there is no practicable alternative that will have fewer adverse impacts.

On January 15, 2003, the U.S. Environmental Protection Agency (EPA) and USACE issued joint guidance for determining jurisdiction. USACE and EPA concluded that jurisdiction should not be asserted over isolated waters that are both intrastate and non-navigable, where the only basis for the assertion is the Migratory Bird Rule. Where a wetland is found to be "adjacent" to a navigable water or tributary to navigable water, USACE field staff should assert jurisdiction (USACE and EPA, 2003).

On June 5, 2007, USACE and EPA issued additional guidance. In summary, jurisdiction will be asserted over (1) traditional navigable waters, (2) wetlands adjacent to traditional navigable waters, (3) non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (typically 3 months), and (4) wetlands that directly abut such tributaries.

USACE issued Regulatory Guidance Letter No. 08-02 on June 26, 2008, which provided clarification on conducting jurisdictional determinations (USACE, 2008). Specific requirements resulting from this guidance include the following: (1) use of the Approved Jurisdictional Determination Form to provide information to the USACE to make a "significant nexus" ruling; and (2) use of the Preliminary Jurisdictional Process and Approved Jurisdictional Process to expedite applications where there is clear evidence of jurisdictional waters and/or wetlands (Preliminary Jurisdictional Process), or where there is not clear evidence and the project must go through the "significant nexus" test (Approved Jurisdictional Process).

Previous Jurisdictional Determinations

Determinations have been issued recently by the USACE for nearby water features. An approved jurisdictional determination was received from the USACE Los Angeles District office (File No. SPL-2010-01014-BAH) concluding that waters within the Alta-Oak Creek Mojave and Alta Infill (Alta Wind I-VI and Alta Wind VIII) projects located in the Oak Creek watershed (including portions of Oak Creek) were not under USACE jurisdiction

because they are isolated, with no significant nexus to a traditional navigable water. Any intermittent and ephemeral drainages or other water features on the project site would also be considered isolated, with no significant nexus to a traditional navigable water, and not regulated under the CWA.

1.2 State Regulations

As indicated above, the State of California has authority for issuance of CWA Section 401 Water Quality Certifications for projects that require a CWA Section 404 permit from the USACE. Furthermore, the State regulates discharges of waste to non-federal waters of the State, pursuant to the Porter-Cologne Water Quality Control Act (Porter-Cologne).

Porter-Cologne

Water Code section 13260 requires "any person discharging waste, or proposing to discharge waste, within any region that could affect waters of the State to file a report of waste discharge (an application for waste discharge requirements)" (Water Code §13260(a)(1)). The term "waters of the State" is defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (Water Code §13050(e)).

Under Porter-Cologne, dischargers must notify the regional water board when a project will result in the discharge of dredged or fill material to waters of the State, and the RWQCB is required to issue or waive waste discharge requirements (WDRs) whenever it receives a report of discharge:

> The regional board, after any necessary hearing, shall prescribe requirements as to the nature of any proposed discharge, existing discharge, or material change in an existing discharge... with relation to the conditions existing in the disposal area or receiving waters upon, or into which the discharge is made or proposed. The requirements shall implement any relevant water quality control plans that have been adopted, and shall take into consideration the beneficial uses to be protected, the water quality objectives reasonably required for that purpose ...(Water Code § 13263(a)).

Any excavation or fill placement within these features would require authorization under WDRs to be issued by the Lahonton RWQCB. For construction projects having small dredge/fill impacts to non-federal waters of the State, and that are not required to obtain a National Pollutant Discharge Elimination System (NPDES) permit (i.e., the General Construction Permit adopted by the State Board), coverage under general WDRs may be obtained from the Lahontan RWQCB (R6T-2003-0004). Discharges of fill into waters of the State have been authorized under these WDRs for other wind energy projects in the project vicinity.

Section 1602 of the California Fish and Game Code

This code regulates the alteration of the bed, bank, or channel of a stream, river, or lake, including ephemeral washes. The limit of jurisdiction is subject to the judgment of the California Department of Fish and Game (CDFG) and can include up to the 100-year floodplain level. The Fish and Game Code states that "an entity may not substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel or bank of any river, stream or lake...unless certain conditions are met." Activities

that have the potential to affect jurisdictional areas (i.e., drainages on the project site, including intermittent/ephemeral streams) will require a Streambed Alteration Agreement (SAA) from CDFG. The SAA will specify conditions and mitigation measures that will minimize impacts on water and riparian resources from proposed actions.

3.0 Field Methods

During surveys conducted from April 25–30, 2011, CH2M HILL delineated waters of the State potentially subject to CDFG and RWQCB jurisdiction that could be affected by construction and operation of the project. Field delineations were conducted by field biologists and wetland scientists having substantial experience performing jurisdictional delineations in arid environments. Field methodology and preliminary results are provided below. Representative photographs of stream crossing are attached.

Prior to conducting field surveys, aerial photographs, high-resolution topographic maps, and maps of NHD blue-line streams and NWI wetlands were used to determine potential locations of waters of the State. Surveys for linear facilities (i.e., turbine strings, collection lines, access roads) were conducted within a 400-foot buffer area surrounding the alignment (200 feet either side of the centerline); and surveys of proposed buildings and temporary construction areas were conducted within a 500-foot buffer area surrounding the footprint of the feature. Spatial data for project boundaries, survey areas, and potential drainage features were uploaded onto global positioning system (GPS) equipment having sub-meter accuracy to assist with site navigation and mapping. In the field, transects were walked along linear features and 200 feet on either side of the centerline of these features. For project structures and temporary construction areas, transects were walked perpendicular to the direction of stream flow. Spacing of transects was sufficient to document the presence of any stream or wetland features that might be present. Surveys of a proposed offsite transmission line were also conducted within a 400-foot buffer area surrounding the alignment (200 feet on either side of the centerline).

The RWQCB/CDFG jurisdictional boundaries were identified by measuring the stream widths at the tops of banks (TOB), maximum flood-prone area (if banks were not present), or the edges of the driplines of riparian vegetation, if present. Channel depths were visually estimated at the thalwag (defined as the deepest part of the cross-sectional channel). Changes in vegetation, streambed, and soil characteristics were noted.

Most of the streams surveyed were typical of arid ephemeral streams—they were relatively narrow with a single channel and well-defined banks that would contain higher volume flow. Some streams surveyed were alluvial washes or fans. These systems often contained braided and/or multiple channels with islands that are most likely within the active floodplain or flood-prone area. In these systems, the TOB width captures those island/terraces that are part of the active floodplain contained within the braided channels. The active floodplain within these systems contained typical alluvial fan scrub vegetation that was also used to help identify the extent of the active floodplain or flood-prone area.

A 25-foot steel tape measure was used to measure shorter widths and estimate depth. An Impulse 200LR laser range finder was used to measure distances of more than 25 feet and to measure the 200-foot distance to upstream and downstream points.

The stream data was collected at each crossing and recorded using the GPS. Wetlands were assumed to be present if hydrophytic vegetation and wetland hydrology were observed. Photographs were taken at each stream crossing point.

Following field surveys, polygons were created in geographic information system (GIS) for all state jurisdictional stream features, utilizing stream width measurements in conjunction with aerial imagery. Intersections of project features (such as access roads and collector lines) and jurisdictional waters were identified in GIS, and mapped as stream crossings.

4.0 Results

Based on the desktop review, the surveys, and other field evaluations, none of the water features observed on the Project site would be subject to regulation under the federal Clean Water Act.

State jurisdictional ephemeral streams and desert washes were delineated within the survey area. No probable wetlands were delineated as hydrophytic vegetation and no wetland hydrology were observed. In addition, no riparian vegetation was present along stream corridors. The total area of potential waters of the State delineated on site is approximately 42 acres. The portion of Cache Creek on site is approximately 14 acres.

Based on the current preliminary design, proposed project features, such as access roads and collector lines, will intersect ephemeral streams in approximately 99 locations, and will result in approximately 5 acres of dredge/fill impacts (see Figure 4). As shown in Figure 4, crossings are labeled in accordance with the type of project feature present. Access roads are labeled in the 100s, collector lines in the 200s, and in locations where access lines and collector lines occur together they are labeled in the 300s.

As stated above, no riparian or wetland vegetation was observed within the survey areas. Vegetation observed consisted primarily of upland species, as listed in Table 1.

TABLE 1
Plants Observed in the Project Boundary

Common Name	Scientific Name
Indian ricegrass	*Achnatherum hymenoides*
Desert needlegrass	*Achnatherum speciosum*
White bursage	*Ambrosia dumosa*
Fiddleneck	*Amsinckia tessellata*
Common saltbush	*Atriplex polycarpa*
Bractscale	*Atriplex serenana*
Red brome	*Bromus madritensis* ssp. *rubens*
Cheat grass	*Bromus tectorum*
Mojave suncup	*Camissonia brevipes*
Brittlebush	*Encelia farinosa*
California ephedra	*Ephedra californica*

TABLE 1
Plants Observed in the Project Boundary

Common Name	Scientific Name
Interior goldenbush	*Ericameria linearifolia*
Rubber rabbitbrush	*Ericameria nauseosa*
California buckwheat	*Eriogonum fasciculatum*
Redstem filaree	*Erodium cicutarium*
Rattlesnake weed	*Euphorbia albomarginata*
Hopsage	*Grayia spinosa*
Cheesebush	*Hymenoclea salsola*
California juniper	*Juniperus californica*
Utah juniper	*Juniperus osteosperma*
Creosote bush	*Larrea tridentata*
Desert alyssum	*Lepidium fremontii*
Scalebroom	*Lepidospartum squamatum*
Mojave aster	*Machaeranthera tortifolia*
Beavertail cactus	*Opuntia basilaris*
Silver cholla	*Opuntia echinocarpa*
Phacelia	*Phacelia* sp.
Desert bitterbrush	*Purshia tridentata* var. *glandulosa*
Desert bitterbrush	*Purshia tridentata* var. *glandulosa*
Chia	*Salvia columbariae*
Purple sage	*Salvia dorrii*
Prince's plume	*Stanleya pinnata*
Tamarisk	*Tamarix* spp.
Joshua tree	*Yucca brevifolia*
Mojave yucca	*Yucca schidigera*

5.0 References

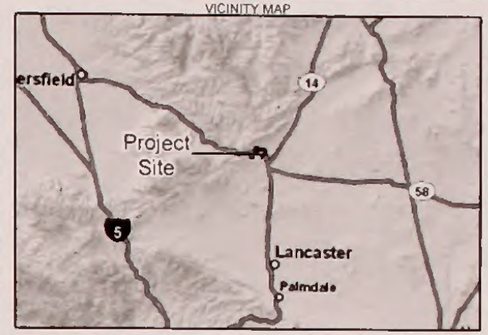
U.S. Army Corps of Engineers (USACE). 2008. Regulatory Guidance Letter 08-02: Jurisdictional Determinations. 26 June.

U.S. Army Corps of Engineers (USACE) and Environmental Protection Agency (EPA). 2003. Federal Register Vol. 68, No. 10. Appendix A: Joint Memorandum.

U.S. Army Corps of Engineers (USACE) and Environmental Protection Agency (EPA). 2007. Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States. June 5.

Figures

VICINITY MAP



LEGEND

- Project Boundary
- Transmission Line
- Townships
- Highway

AGENCY

- BLM
- Private
- State

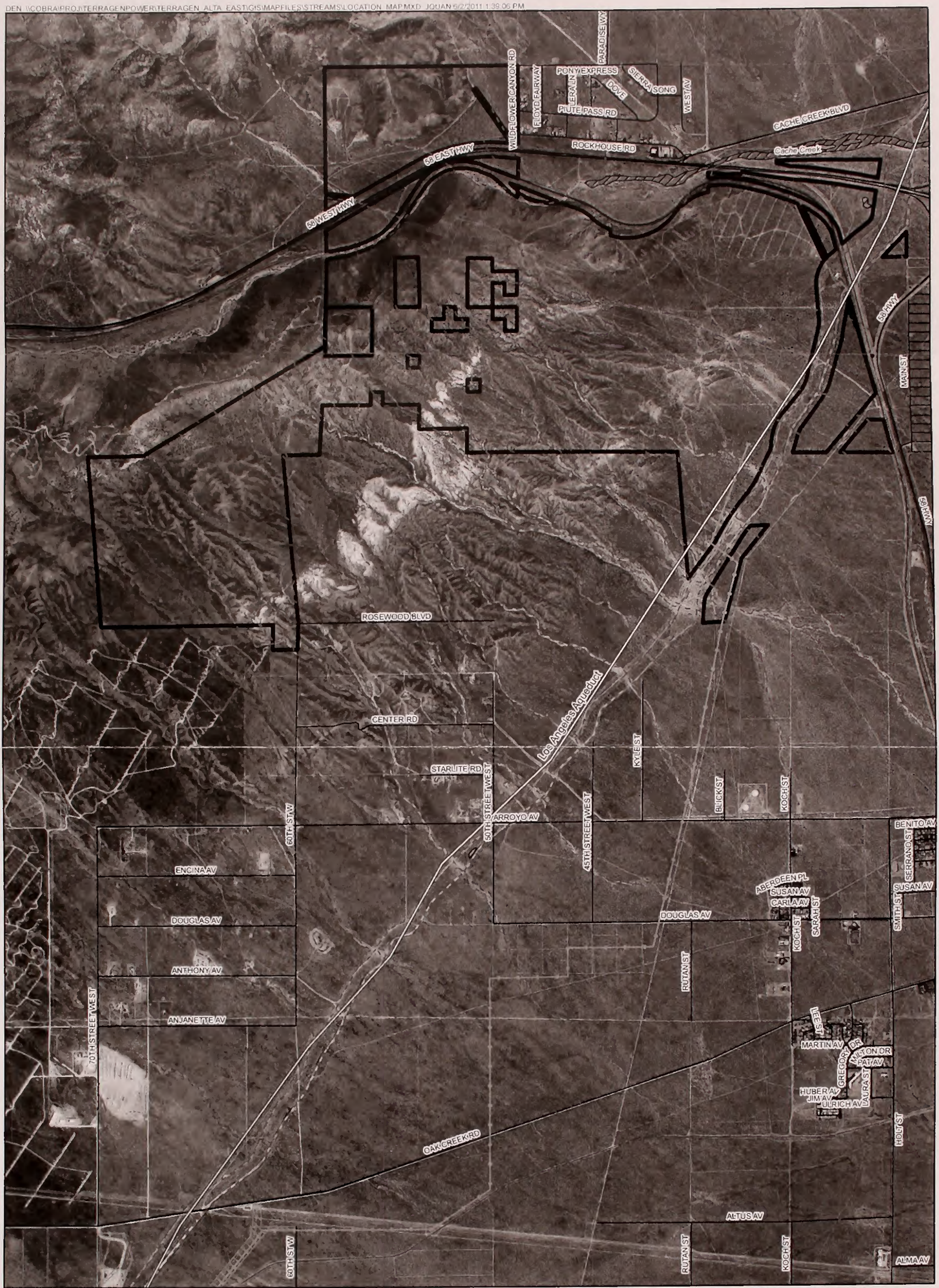
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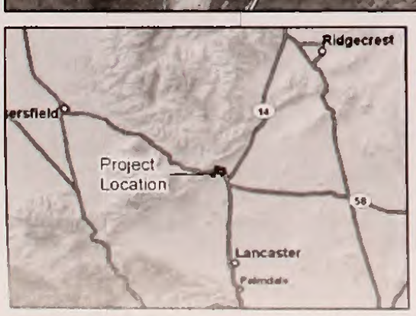
FIGURE 1
Regional Vicinity Map
Alta East Wind Energy Project
Kern County, California

CH2MHILL

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LEGEND

- Project Boundary
- Alta Oak Creek Mojave and Alta Infill Shared Areas
- Kern County Roads
- Transmission Line
- LA Aqueduct
- NHD Streamline

NWI

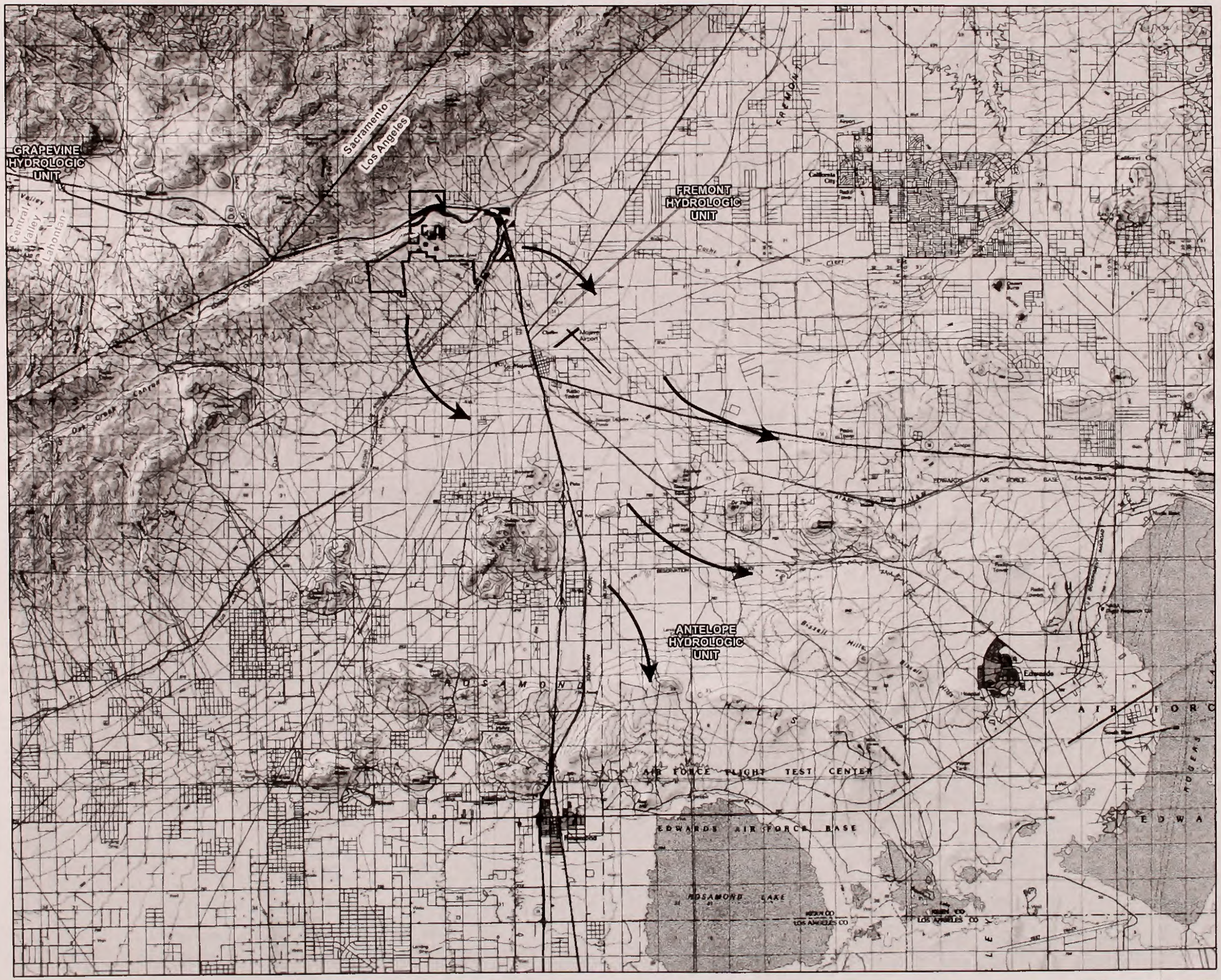
- Riverine
- Other

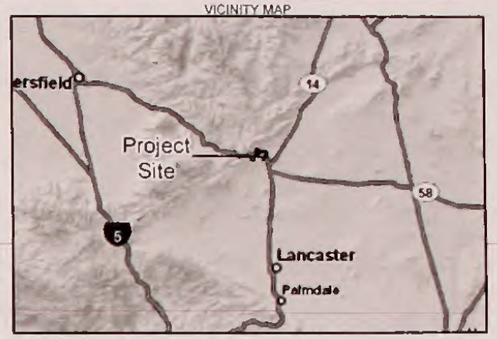
N

0 1,250 2,500
Feet

Figure 2
Location Map
Alta East Wind Energy Project
Kern County, California

CH2MHILL





LEGEND

- Transmission Line
- Project Boundary
- RWQCB
- USACE Boundary
- Hydrologic Unit
- Surface Water Flow

N

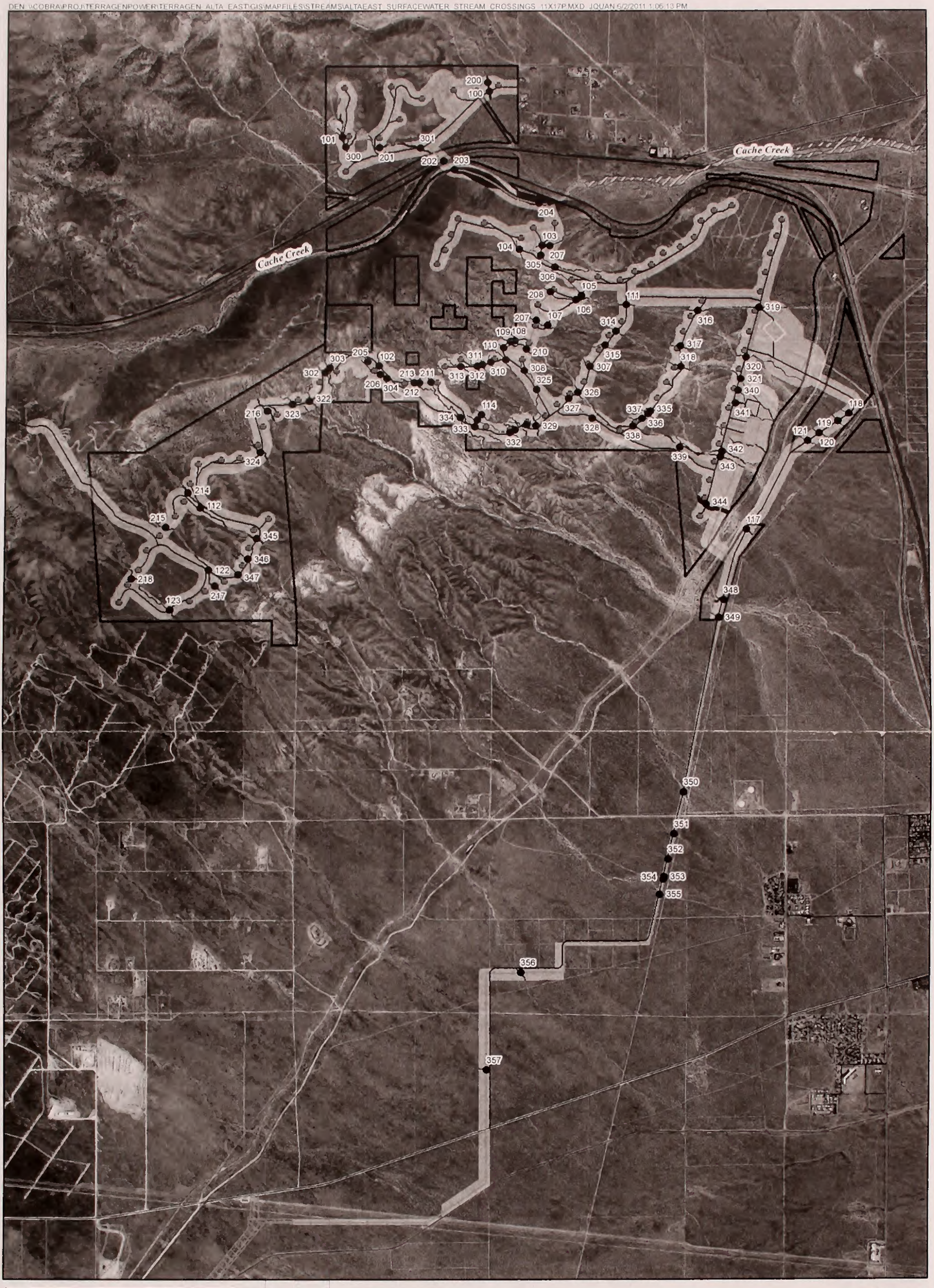
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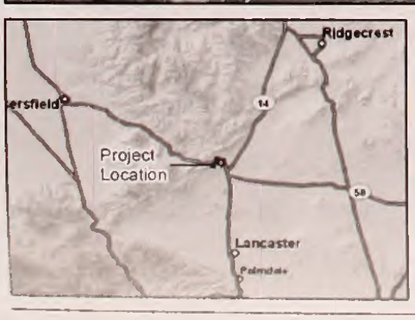
FIGURE 3
Hydrology Map
Alta East Wind Energy Project
Kern County, California

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LEGEND

- Stream Crossing
- Turbine
- Collectors
- Access Road
- Transmission Line
- Project Boundary
- Substation
- O&M Building
- Laydown
- Batch Plant
- Alta Oak Creek Mojave and Alta Infill Shared Areas
- Survey Area
- NHD Streamline
- NWI Wetland
- Stream Delineation

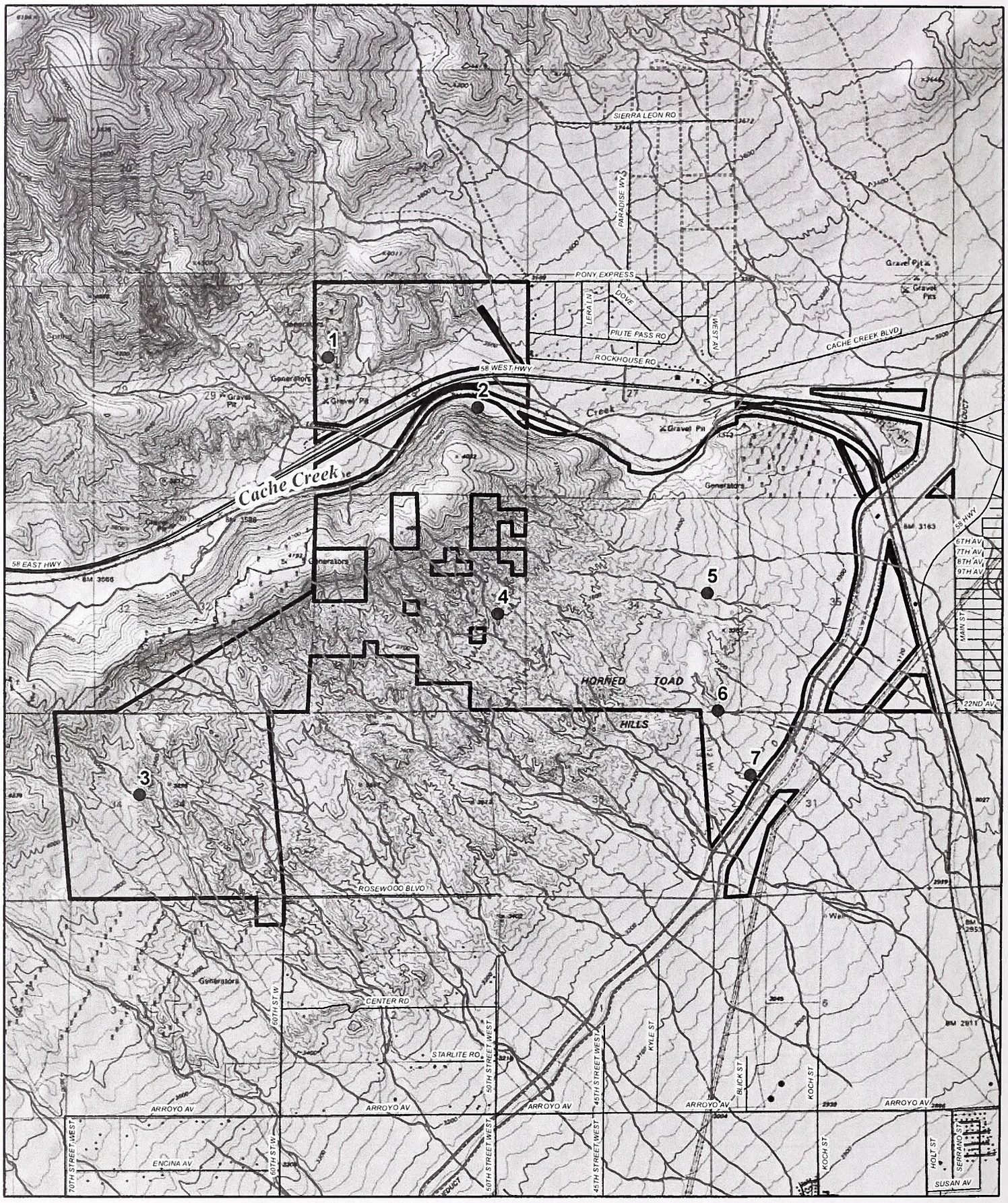
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Figure 4
Stream Crossings
Alta East Wind Energy Project
Kern County, California

CH2MHILL

Attachment
Representative Stream Crossing Photographs



LEGEND

- Photo Locations
- Kern County Road
- NHD Streamline
- Project Area

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Feet

Overview

Alta East Wind Energy Project

Kern County, California



Photo Location 1. Delineated drainage feature, north of Hwy. 58. Approximate elevation 3,704 feet.

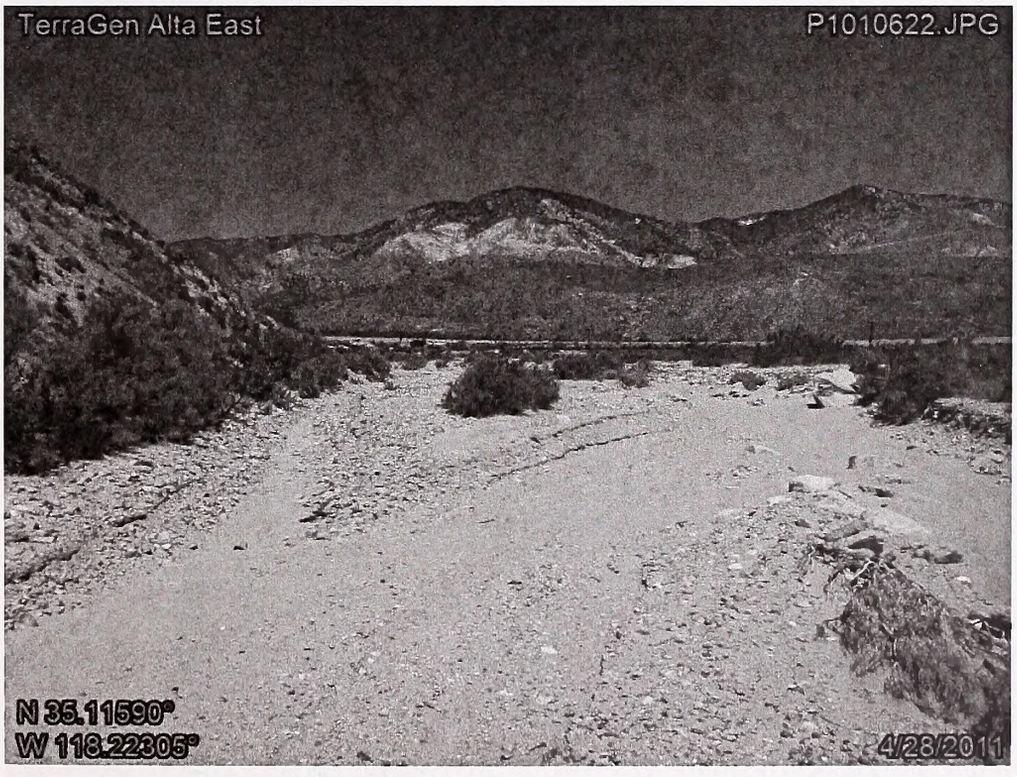


Photo Location 2. Delineated drainage feature, Cache Creek, south of Hwy. 58. Approximate elevation 3,423 feet.



Photo Location 3. Delineated drainage feature showing OHV use, southwest side of Project. Approximate elevation 3,841 feet.

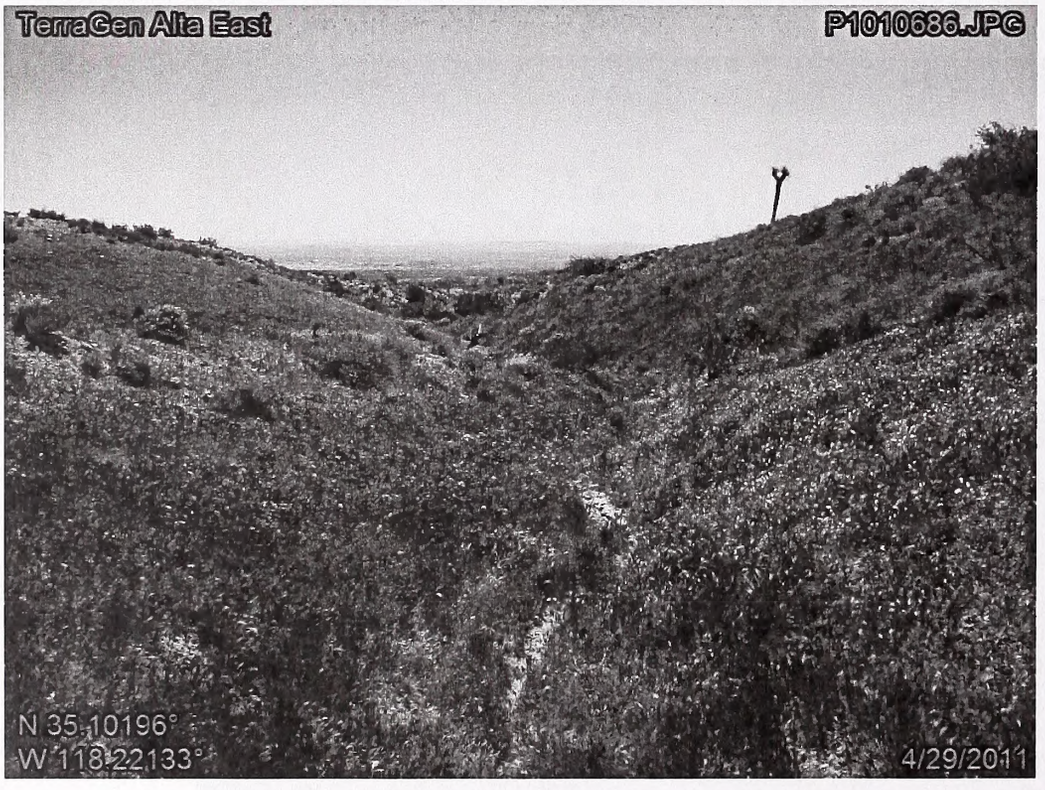


Photo Location 4. Delineated drainage feature, south central Project area. Approximate elevation 3,596 feet.



Photo location 5. Delineated drainage feature, east side of Project site. Approximate elevation 3,337 feet.

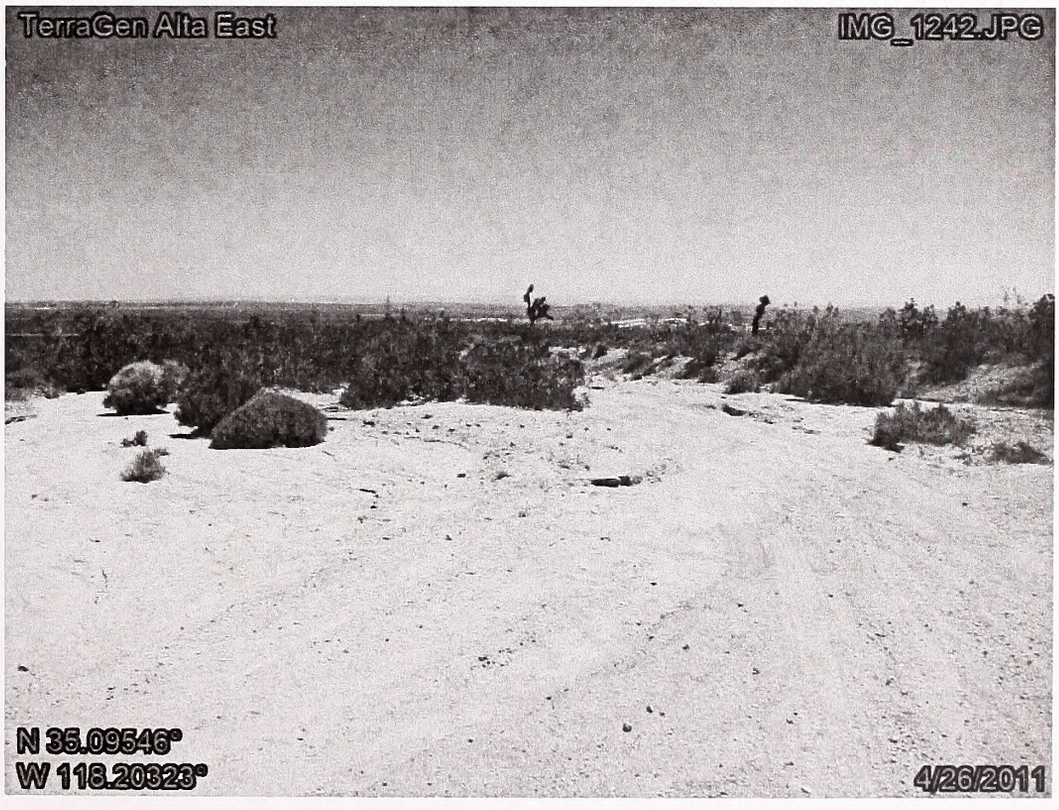


Photo location 6. Delineated drainage feature, southeast Project area. Approximate elevation 3,260 feet.

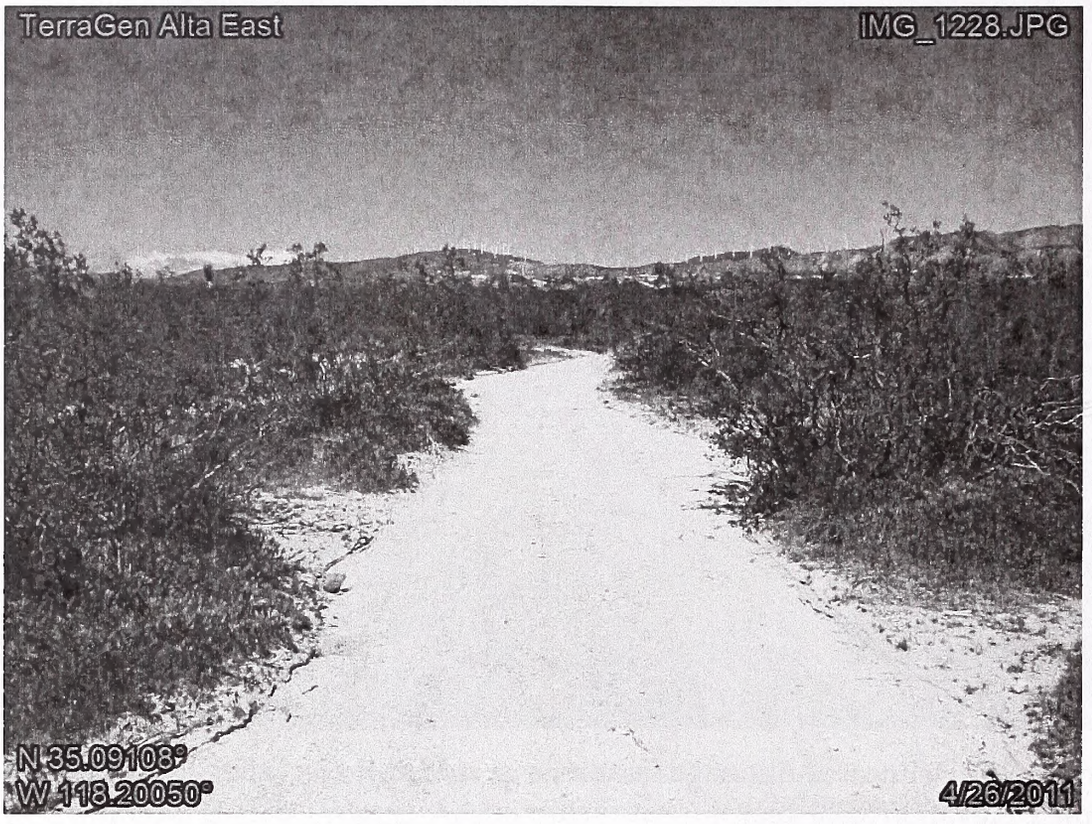


Photo location 7. Delineated drainage along transmission line, southeast Project area. Approximate elevation 3,192 feet.

Appendix D-29

Preliminary Draft #2 Avian Protection Plan March 2012

Preliminary Draft No. 2

Avian Protection Plan for the Avoidance and Minimization of Potential Impacts to Avian Species

Alta East Wind Project

Submitted to

U.S. Fish and Wildlife Service

Submitted by

Alta Windpower Development, LLC

March 2012

Prepared by

CH2MHILL

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Appendix

A California Condor Mitigation Strategy

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4 Alta East Project Boundary and Avian Use Survey Points from July 10, 2010 to June 1, 2011.
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6 Results of Raptor Nest Survey Results Completed for the Alta East Project Area in 2011.
7 Results of Burrowing Owl Surveys completed for the Alta East Project Area from May 30-July 15, 2010.

Acronyms and Abbreviations

APLIC	Avian Power Line Interaction Committee
AWD	Alta Windpower Development, LLC
BGEPA	Bald and Golden Eagle Protection Act
BLM	U.S. Bureau of Land Management
BMP	best management practice
CDFG	California Department of Fish and Game
CEC	California Energy Commission
dBA	A-weighted decibels
kV	kilovolt
MBTA	Migratory Bird Treaty Act
SR	State Route
USFWS	U.S. Fish and Wildlife Service
WEST	Western EcoSystems Technology, Inc.
WTG	wind turbine generator

SECTION 1.0

1 Introduction

1.1 Project Description

Alta Windpower Development, LLC (AWD) proposes to construct the Alta East Wind Project in the Tehachapi region of southern California. Portions of the project would be located on land managed by the U.S. Bureau of Land Management (BLM) and privately owned land under the jurisdiction of Kern County. The proposed development is a wind energy facility with a nameplate capacity rating of approximately 300 megawatts of wind turbine generation and includes ancillary facilities and supporting infrastructure. Up to 120 wind turbine generators (WTG) would be installed. The project includes repowering a historical wind power project site north of SR 58 on BLM lands.

The project is proposed to be located on approximately 3,195 acres on the northern and southern sides of State Route (SR) 58 in southeastern Kern County, California, within and adjacent to an area of existing wind development. The project area is approximately 3 miles northwest of the town of Mojave and approximately 11 miles east of the city of Tehachapi. Approximately 30 percent of the project's area (1,115 acres) and approximately 33 percent of the WTGs would be located on land under the jurisdiction of Kern County. The location of the project site is shown on Figure 1, Project Area Map.

BLM is the lead agency for review under the National Environmental Policy Act. The U.S. Fish and Wildlife Service (USFWS) is a cooperating agency involved in Section 7 consultation under the federal Endangered Species Act.

1.2 Purpose of the Avian Protection Plan

AWD has developed an Avian Protection Plan (APP) for the project to identify the reasonably foreseeable threats to avian species and to develop effective response measures to avoid or minimize these potential impacts. AWD is establishing this APP as a commitment to construct and operate the project in a manner that proactively addresses potential impacts on protected avian species. Under the Migratory Bird Treaty Act (MBTA) (16 United States Code [USC] §§ 703-712) (USFWS, 1998) it is "unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product...". The MBTA does not have provisions for authorizing "take" of migratory birds that may be killed or injured by otherwise lawful activities. Golden eagles, which are afforded protection under the MBTA and the Bald and Golden Eagle Protection Act (BGEPA) (16 United States Code §§ 668-668c), are addressed in the draft Eagle Conservation Plan provided to USFWS on March 22, 2011; however, many of the avoidance and conservation measures identified in this APP have the added benefit of minimizing risk and potential impacts on eagles. Bat detection rates in baseline studies for

the project are low and bat fatality rates in the region are low, therefore, potential bat impacts and bat protection measures are not addressed in this plan.

1.3 Interagency Coordination and Communication History

April 29, 2010	AWD provided USFWS with the biological resources study plan for review and input.
November 29, 2010	Representatives from AWD met with Ashleigh Blackford and Danielle Dillard of USFWS and Justin Sloan of the California Department of Fish and Game (CDFG). Jacqui Kitchen of the Kern County Planning Department participated via telephone. The project was introduced and the results of baseline wildlife studies completed to date were presented.
November 30, 2010	AWD received correspondence from USFWS regarding the baseline study plan presented to USFWS in April 2010.
December 10, 2010	AWD responded to correspondence from USFWS regarding the baseline study plan
March 22, 2011	Draft Eagle Conservation Plan was submitted to USFWS.
April 29, 2011	Draft APP was submitted to USFWS
September 26, 2011	Comments on draft APP from USFWS provided to AWD
March 8, 2012	AWD responses and revised APP provided to USFWS.

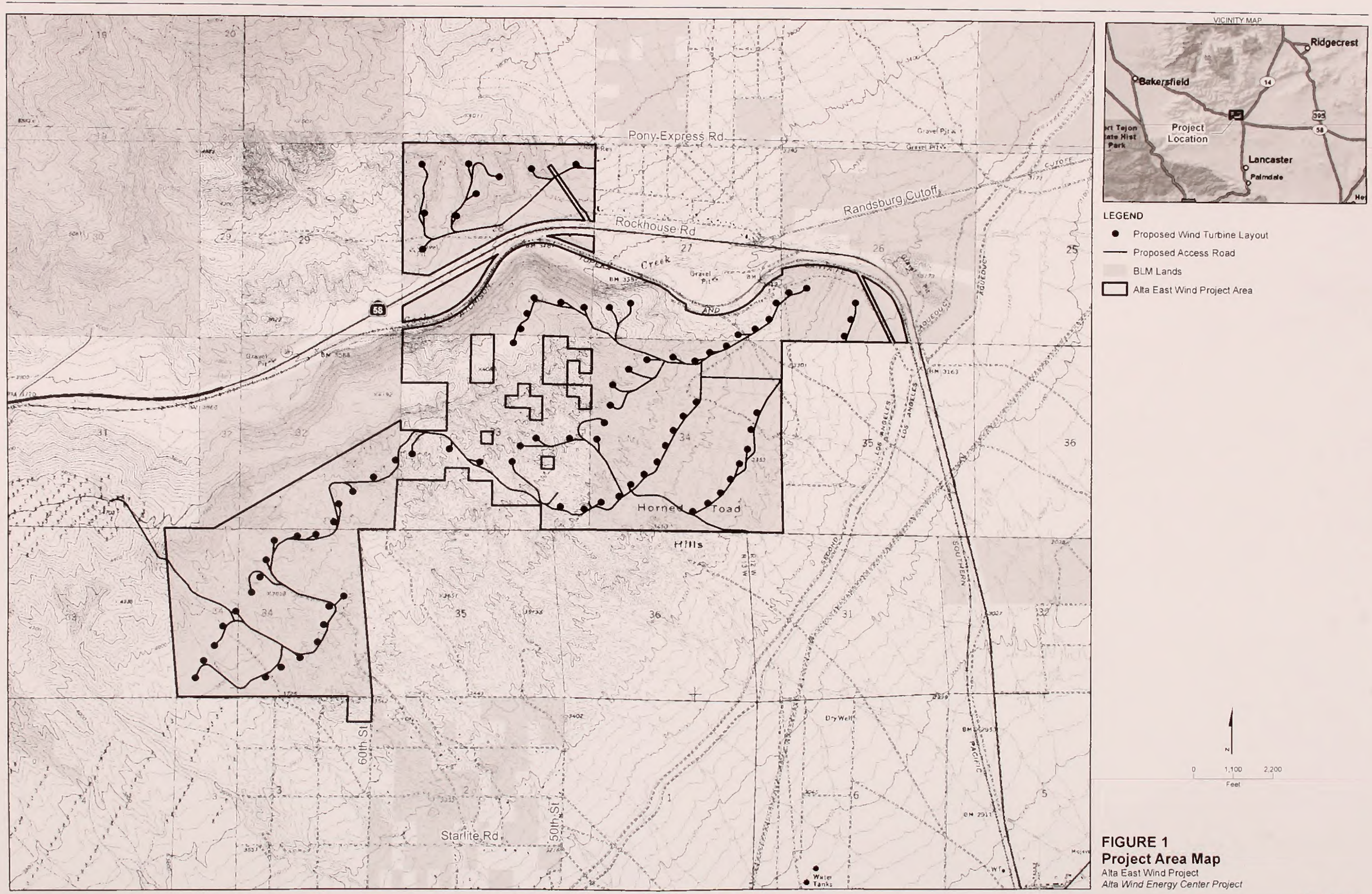


FIGURE 1
Project Area Map
Alta East Wind Project
Alta Wind Energy Center Project

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SECTION 2.0

2 Site Assessment and Surveys

2.1 Initial Site Assessment

In July 2009, AWD completed an initial site assessment to evaluate potential constraints or risks to successful project development. This area of the Tehachapis was specifically selected for evaluation because of the extensive existing wind energy development in the region, the expected low level of avian impacts associated with the operating projects, the lack of critical habitat for federally endangered species, and the manageable issues related to other special-status species potentially present on site. Based on pre-field review of publicly available resources (California Natural Diversity Database [CDFG, 2009], California Native Plant Society database [2009], BLM special-status species management manual [BLM, 2001], and the California Desert Conservation Area Plan [BLM, 1999]), as well as reconnaissance surveys conducted at the site between 2006 and 2009 and during a March 19, 2009, site visit specifically designed to evaluate potential resource issues, it was determined that the site presented low levels of risk to avian resources and that investment in site-specific resource studies was warranted.

AWD determined that avian species are present on the site, but that no wetlands or riparian areas exist on site that would attract avian species or provide unique habitat that would preclude potential development of a commercial-scale wind energy project. AWD determined that further study to understand and define the risk issues would yield sufficient information to construct and operate the project without significant adverse impacts to protected avian species and therefore completed detailed site surveys to identify potential risk issues warranting impact avoidance or minimization measures.

2.2 Site-specific Surveys and Assessment

AWD has implemented a comprehensive avian study program to consider avian species and their habitat. Survey protocols were presented to USFWS and CDFG for review in April 2010; comments were received and suggestions incorporated into the protocols where feasible. The avian study program consisted of vegetation mapping, avian use surveys, burrowing owl surveys, and raptor nesting surveys. Additionally, in 2009 AWD completed a general biological resource assessment for the project to determine the likelihood of special-status species occurring in the area proposed for development, as well as to identify important or unique avian habitats such as riparian corridors, wetlands, unique topography, or potential migratory stopover habitat that might warrant consideration in avian studies and APP development.

Baseline avian use studies for the project included 30-minute point counts conducted from May 2009 through March 2011 at approximately 1-week intervals throughout the area proposed for development. The avian point count surveys were completed in accordance with *The California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy*

Development (California Energy Commission [CEC], 2007). These surveys were designed to document species using the proposed project site, identify seasonal and spatial patterns of use, and identify general and specific risk factors that could be eliminated or reduced through micrositing or modification of project features.

In addition, helicopter surveys were completed in April and May 2010, and February and April 2011, to identify nesting Swainson's hawks within 5 miles of the project area and other nesting raptor species within 2 miles. Additionally, to augment the helicopter surveys for Swainson's hawks, three ground-based surveys were completed between April 25 and April 30, 2011 within 5-miles of the project to detect nesting Swainson's hawks. The analysis area for Swainson's hawk nests was determined in accordance with *Swainson's Hawk Survey Protocols, Impact Avoidance, and Minimization Measures for Renewable Energy Projects in the Antelope Valley of Los Angeles and Kern Counties, California* (CEC and CDFG, 2010). A 2-mile analysis area was established for other nesting raptor species to enable detection of nests that could potentially be subject to construction period disturbance that were beyond the project boundary. Additionally, surveys to detect burrowing owls were completed in 2010 in accordance with the *Burrowing Owl Survey Protocol and Mitigation Guidelines* prepared by the California Burrowing Owl Consortium (1993).

Site-specific survey methods and results are summarized below, and complete avian reports that include detailed discussion of methods and results are presented in Chatfield et al. (2010a, b, and c) and Phoenix Ecological Consulting (2010).

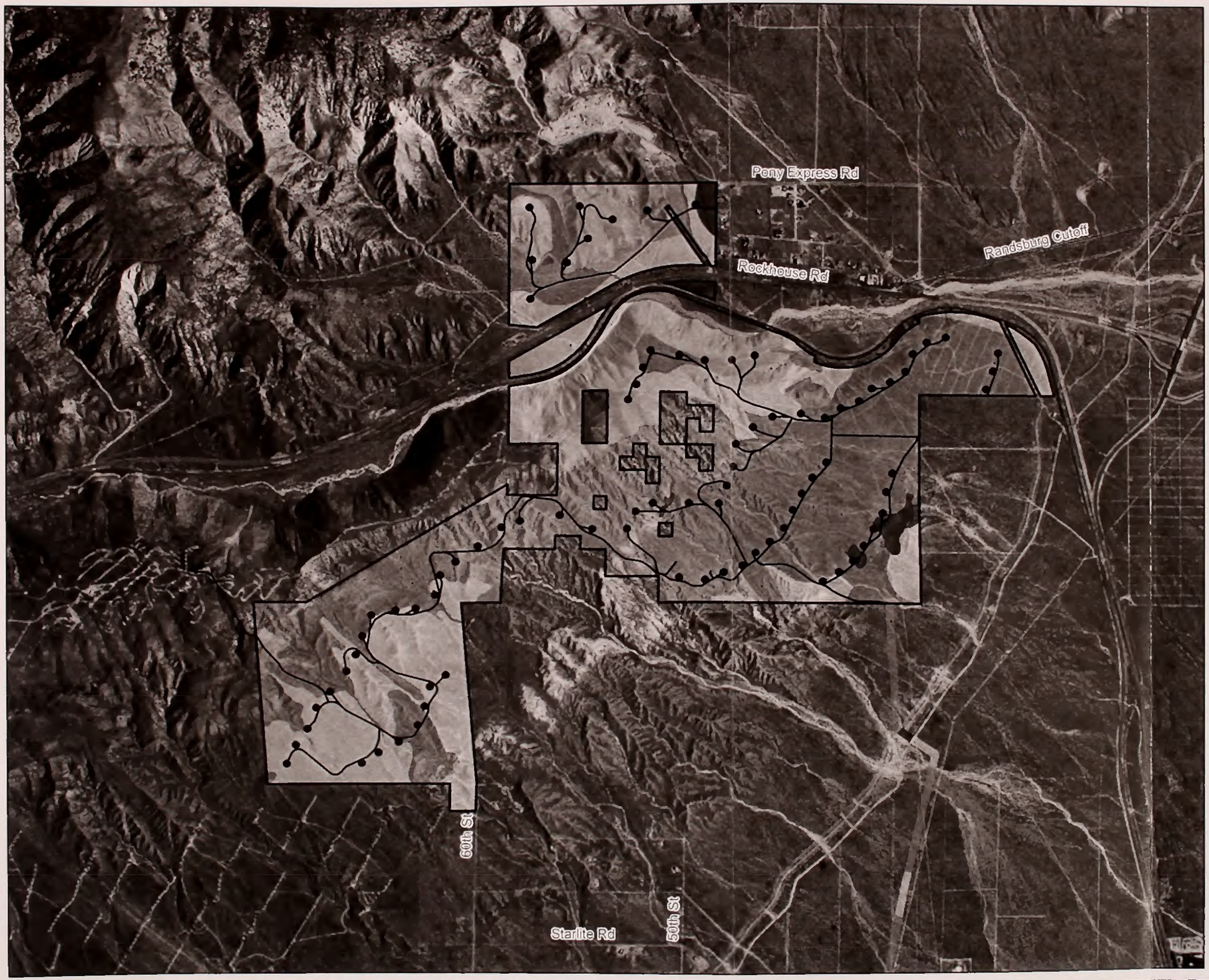
2.2.1 Habitat Assessment

CH2M HILL biologists identified eight general community types on the project site: creosote bush scrub, brittlebush scrub, rabbitbrush scrub, California buckwheat scrub, scalebroom scrub, desert almond scrub, California juniper woodland, and Joshua tree woodland. Substantial overlap in species composition occurs among the community types and the boundaries are generally diffused with gradual transitions between the mapped community types. Therefore, the vegetation boundaries shown on Figure 2 are intended to show the general distribution of the community types within the project area.

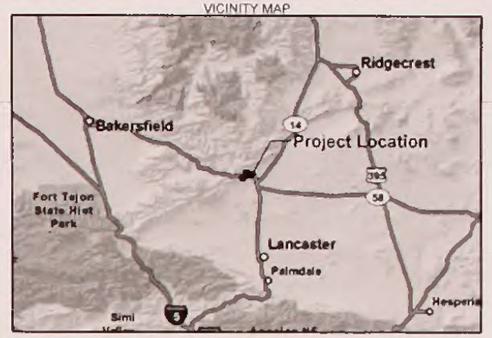
Each community type and edge habitat area likely presents suitable nesting and foraging habitat for a variety of avian communities. Avian survey locations were distributed across these habitat types to adequately document the species composition present at the project site, but surveys were not designed to specifically document habitat associations for each species.

2.2.2 Avian Point Count Surveys

The objective of the fixed-point bird use surveys was to estimate the seasonal and spatial use of the study area by birds, particularly diurnal raptors. Fixed-point surveys (variable circular plots) were conducted using methods described by Reynolds et al. (1980). All birds seen during each 30-minute fixed-point survey were recorded. These surveys are standard assessment techniques used to assess most wind energy projects in California and are completed in accordance with CEC guidelines (CEC, 2007). The point counts completed for this project are used to identify the species using the project and to determine seasonal mean use values by species that serve as an index to abundance. The index correlates well to



VICINITY MAP



LEGEND

- Proposed Wind Turbine Layout
- Proposed Access Road
- Project Area

Vegetation Type

- Brittlebush Scrub/Mormon Tea Scrub
- California Buckwheat Scrub
- California Buckwheat/Saltbush Scrub
- California Juniper Woodland
- Cheesebush Scrub
- Cheesebush/Bursage Scrub
- Creosote Bush Scrub
- Disturbed/Ruderal
- Joshua Tree Woodland
- Rabbitbrush Scrub
- Scalebroom Scrub

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FIGURE 2
Vegetation Communities
Alta East Wind Project
Alta Wind Energy Center Project

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raptor fatality estimates for projects that have both baseline and postconstuction fatality data, and is thus an effective statistic for determining fatality risk for many species likely to use the project area. Similarly, risk can be evaluated as a function of mean use and behavior (flight height) to compare relative risk by species.

Six points were selected to survey representative habitats and topography, while providing relatively even coverage of the area that was proposed for development in May 2009 (Figure 3). The project boundary was modified to include additional area in June 2010, so the locations of three of the six avian use survey points were modified to ensure coverage of the revised project area (Figure 4). In June 2010, avian survey point 4 was moved approximately 0.5 miles south to allow the assessment viewshed to encompass the entire parcel located north of Highway 58. Points 5 and 6 were moved south of the highway, Point 5 approximately 0.5 mile south and Point 6 approximately 2 miles southeast, to enable full assessment of eagle use along the ridge located south of Highway 58 and of the southwestern portion of the new project area. These year 2 survey locations were evaluated for one full year during the second year of the study.

Relocating these avian survey points assists in the analysis of avian use of the area planned for WTG installation by focusing the study on the area planned for development.

A total of 311 30-minute fixed-point bird use surveys were conducted during 52 site visits, from May 2009 through May 2010. Sixty-one unique bird species were identified over the course of 311 30-minute surveys, representing 2,581 individuals within 1,044 groups. A total of 43 raptors were observed, representing six species. Among large birds, common raven had the highest use of any other species across all seasons (spring 1.56 birds/plot/30-minute survey; summer, 0.44; fall, 1.29; and winter, 0.89). Waterbird use was recorded only during spring (0.73 birds/plot/30-minute survey), while vultures use was recorded during spring (1.04) and fall (0.23). Raptor use was highest during the winter (0.20 birds/plot/30-minute survey) and lowest during the summer (0.10). A total of 43 individual raptors, representing six unique species, were observed during surveys, with red-tailed hawk and golden eagle being the most commonly observed raptor species. All golden eagle observations in Year 1 were recorded north and west of the area proposed for development at points 4, 5, and 6, and these are discussed in detail in the Eagle Conservation Plan (ECP) prepared for the project. Use by passerines was higher in winter (7.26 birds/plot/30-minute survey) and spring (7.07), compared to fall (5.23) and summer (2.28). Bird types most often observed flying within the turbine rotor-swept height were vultures (58.3%) and raptors (23.1%). Most of the passerines (94.4%) were observed below the rotor-swept heights, and the remaining 5.6 percent were observed flying within the rotor-swept height.

The annual mean raptor use estimate (number of raptors divided by the number of plots and the total number of surveys) for this period was compared to mean raptor use estimates from 39 other studies that implemented similar protocols and had data for three or four different seasons. Mean annual raptor use was 0.09 raptors/plot/20-minute survey from May 2009 to May 2010, ranking second lowest compared to raptor use at the other wind resource areas (Chatfield et al., 2010a). Raptor mean use at points 1, 2, and 3 was 0.03 raptors/plot/20-minute survey, which was substantially less than mean use at points 4-6 (0.22 raptors/plot/20-muinute survey), suggesting the area currently planned for development presents substantially less risk to raptors. Based on these seasonal use

estimates, it is expected that risk to raptors would be unequal across seasons, with higher risk during the winter and relatively low risk during other times of the year.

A total of 260 30-minute fixed-point bird use surveys were conducted during 47 site visits, from July 10, 2010 through June 1, 2011 at the six avian use points evaluated during year 2. During this survey period the avian use survey areas were focused more specifically on the project area as currently proposed for development (see Figure 3). Forty-eight unique species were observed during the fixed-point bird use surveys, with a mean of 0.67 large bird species/800-m plot/30-min survey and 1.37 small bird species/100-m plot/30-min survey. Bird diversity (number of unique species) was greater in the spring (38 species) than in the fall (26), winter (20), and summer (16; Table 1). Large bird species richness (mean number of species per survey) was highest in the winter (0.94 species/survey), followed by spring (0.69), fall (0.67), and summer (0.35).

Passerines (not including ravens) were the most frequently recorded bird type, accounting for 59.6 percent of observations, of which sage sparrow, house finch, western meadowlark, and cactus wren were the most frequently observed and accounted for 45.1 percent of the total bird observations. Common raven were the second most frequently observed bird type, comprising 19.4 percent of total bird observations. Raptors accounted for only 1.9 percent of all observations, with the red-tailed hawk and American kestrel being the most commonly observed raptor species during this period. The majority of passerines, large corvids, and raptors recorded during this period were observed in the fall (80.6, 95.1, and 85.7 percent, respectively) indicating extremely low use of the project area by all birds during summer months.

Six species (12.5% of all species) composed 74.6 percent of total observations: common raven (*Corvus corax;* 451 observations), sage sparrow (*Amphispiza belli*; 409), white-crowned sparrow (*Zonotrichia leucophrys*; 404), western meadowlark (*Sturnella neglecta*; 269), western bluebird (*Sialia Mexicana*; 214), and California quail (*Callipepla californica*; 112). All other species composed less than 4 percent of total observations, individually. A total of 48 individual raptors were recorded within the AEWRA, representing nine species: Cooper's hawk (*Accipiter cooperii;* one observations), red-tailed hawk (*Buteo jamaicensis*; 18), Swainson's hawk (*Buteo swainsoni*; one), northern harrier (*Circus cyaneus;* two), golden eagle (*Aquila chrysaetos;* eight), American kestrel (*Falco sparverius*; seven), peregrine falcon (*Falco peregrines*; one), prairie falcon (*Falco mexicanus*; two), and osprey (*Pandion haliaetus*; one. Unidentified accipiter (one observation) and unidentified hawk (six) were also observed during surveys.

Mean bird use, percent composition, and frequency of occurrence were calculated by season for each bird type and species. Large bird use (within 800-m plot) was highest in the winter (4.41 birds/plot/30-min survey), followed by fall (2.75), summer (2.39), and spring (1.64). For small birds (i.e., passerines, swifts/hummingbirds, and woodpeckers), use (within 100-m plots) was highest in the spring and winter (7.70 and 7.41 birds/plot/30-min survey, respectively), and lower in fall (5.35) and summer (1.65). Because different viewsheds were used in the analyses for large and small birds, use estimates calculated for the two groups are not directly comparable.

Diurnal Raptor use was highest during the winter (0.27 birds/800-m plot/30-min survey), with spring and fall having moderate use (0.19 and 0.18, respectively) and summer having

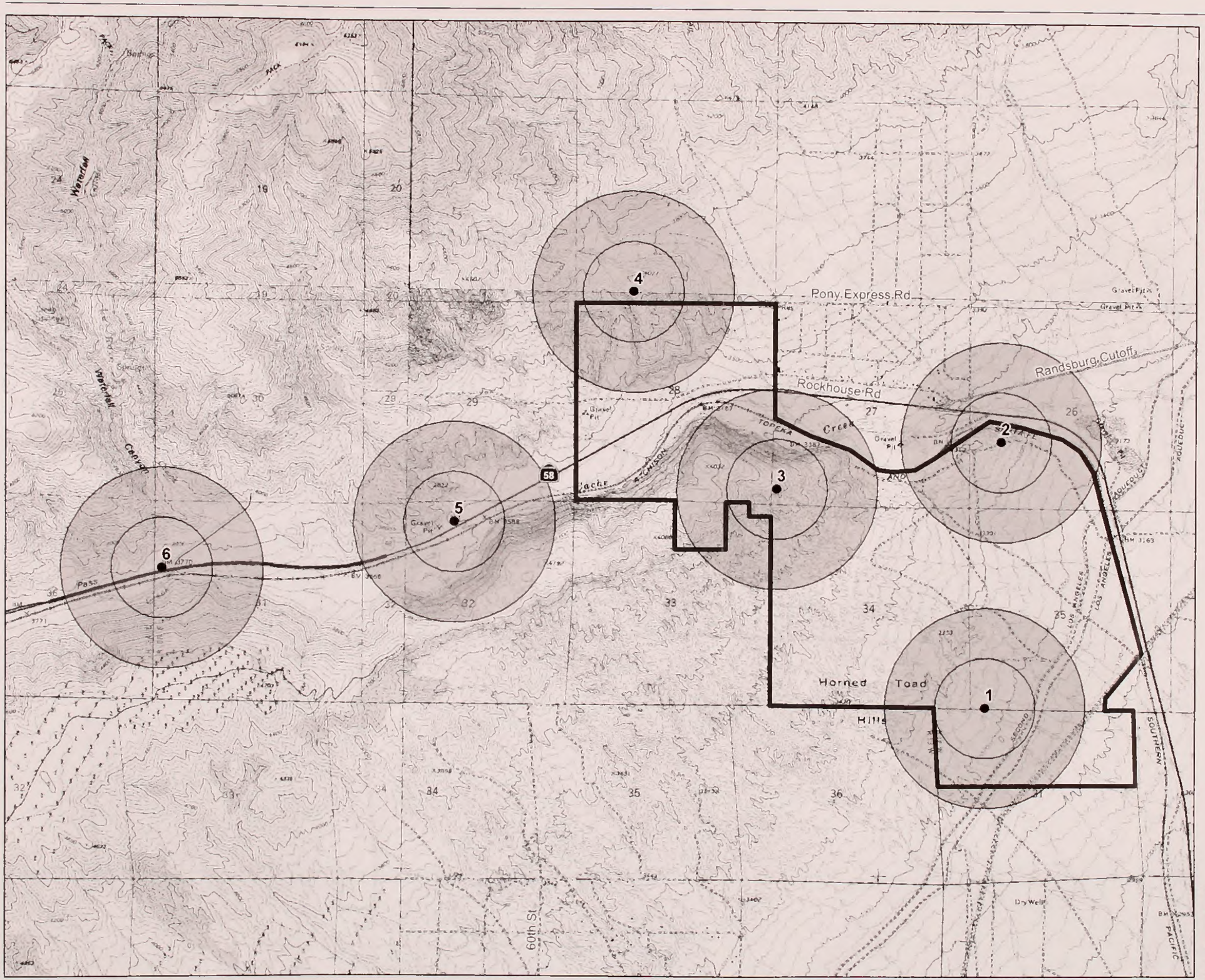


FIGURE 3
Alta East Project Boundary and Avian Use Survey Points from May 11, 2009 to May 6, 2010
Alta East Wind Project
Alta Wind Energy Center Project

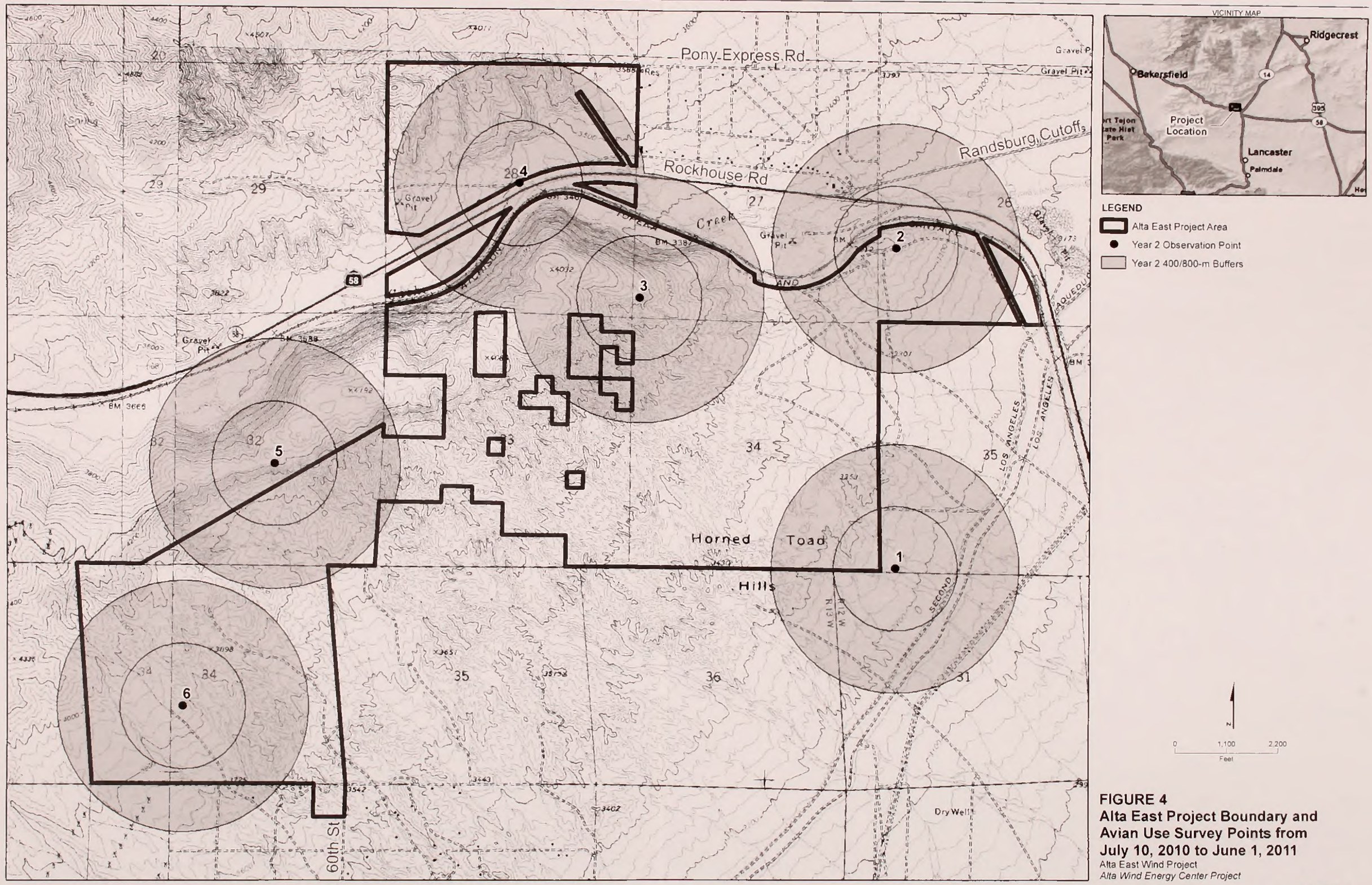


FIGURE 4
Alta East Project Boundary and Avian Use Survey Points from July 10, 2010 to June 1, 2011
Alta East Wind Project
Alta Wind Energy Center Project



considerably lower use (0.04). Higher use in the winter was primarily due to higher use of the area by red-tailed hawk (0.09 birds/plot/30-min survey) and golden eagle (0.08). Red tailed hawk and American kestrel comprised the majority of raptor use during both spring (0.08 and 0.04 birds/plot/3-min survey; respectively) and fall (0.08 and 0.07; respectively). Diurnal raptor use in summer was attributed entirely to a single red-tailed hawk and a single unidentified accipiter. Diurnal raptors comprised 11.7 percent of overall large bird use in spring, 6.7 percent in fall, 6.0 percent in winter, and 1.6 percent in summer. Diurnal raptors were observed during 13.8 percent of spring surveys, 3.7 percent of summer surveys, 13.3 percent of fall surveys, and 22.7 percent of winter surveys.

Among large bird types, four species (common raven, red-tailed hawk, golden eagle, and mourning dove) had at least five groups observed flying. Of these, golden eagle had the greatest percentage of observations within the RSH (87.5%), followed by common raven (75.0%), and red-tailed hawk (73.4%). Four other species (osprey, Copper's hawk, Swainson's hawk, and rock pigeon) were recorded flying within the RSH during 100 percent of the observations; however these were each based on only a single observation. Among small bird types, nine species had at least five groups observed flying. Of these, the only species observed flying within the RSH were white-crowned sparrow (21.6% of observations) and sage sparrow (3.1%). Additional details are provided in Chatifeld et.al 2011.

Annual mean raptor use (number of raptors divided by the number of 800-m plots and the total number of surveys) at the project was compared with raptor use at 43 other sites proposed for wind-energy development in the western and Midwestern US that implemented similar protocols and had data for three or four seasons. The annual mean raptor use at these wind-energy facilities ranged from 0.06 to 2.34 raptors/plot/20-min survey (Figure 5. Based on the results from these wind-energy facilities, a ranking of seasonal mean raptor use was developed as low (0 - 0.5 raptors/plot/20-min survey), low to moderate (0.5 - 1.0), moderate (1.0 - 2.0), high (2.0 - 3.0), and very high (more than 3.0). Under this ranking, mean raptor use at the project site for year 2 studies (0.12 raptors/plot/20-min survey) is considered to be low, ranking third lowest compared to the other wind-energy facilities. On a seasonal basis, mean raptor use estimates at the project were consistently low across all seasons when compared with other projects with the highest ranking occurring during the winter, when the project site presents the 13th lowest mean use value out of 41 sites (Chatfield et al. 2011)..

2.2.3 Nesting Territory Surveys

Aerial nest surveys were conducted via helicopter on April 13 and May 24, 2010, within 5 miles of the project area to identify Swainson's hawk nests and within 2 miles of the project to identify other raptor nests. No Swainson's hawk nests were recorded and nine inactive raptor nests and one active raven nest were located within 2 miles of the project. No active raptor nests were located within the boundary of the project, or within 2 miles of the project during the 2010 surveys.

One aerial nest survey was conducted in late February 2011 and a second was completed during the week of April 11, 2011 and three ground surveys for Swainson's hawk nests were completed in late April. In additional to evaluating potential nesting habitat for new or previously undocumented nests, all nests detected in 2010 were specifically evaluated.

Findings were consistent with 2010 surveys – no Swainson's hawk nests were observed within 5 miles of the project, and no active raptor nests were detected within 2 miles of the project. One inactive raptor nest and two active common raven nests were identified within two miles of the project. All nests reported in 2011 survey are presented in Figure 6.

2.2.4 Burrowing Owl Surveys

Protocol-level surveys for burrowing owl were completed for 992 acres of the project area from May 30 to July 15, 2010. The survey results were positive for burrowing owl sign, but negative for breeding burrowing owls during the 2010 survey efforts. Burrowing owl whitewash was detected at two burrows located near avian use survey point 2 in the northeastern portion of the project, near an incidental observation reported by WEST in their Year 1 avian use surveys on March 19, 2010; however, no burrowing owls were recorded during the protocol-level survey efforts. Details of the burrowing owl survey are provided in Phoenix Ecological Consulting (2010) and Figure 7.

2.2.5 Species Recorded

During the course of all surveys completed for the project, a total of 73 avian species were recorded (Table 1). Sixty one species were recorded during year 1 avian use surveys and 48 species were recorded in year 2, of which 10 were not recorded during year 1 surveys. Two additional species were reported during the burrowing owl survey (Lesser nighthawk and lesser yellowlegs). USFWS designated Birds of Conservation Concern (BCC) for Bird Conservation Region 32 are noted per the USFWS 2008 BCC list (USFWS 2008). Those BCC designated species that are likely to breed/nest in the project area based on likely habitat associations are also noted.

Table 1
Avian Species Recorded during all Biological Resource Surveys Completed for the Alta East Project from May 2009 to June 1, 2011

Common Name	Scientific Name	Status
Raptors		
American kestrel	*Falco sparverius*	
burrowing owl	*Athene cunicularia*	BLMS, BLMSSC, CASSC, BCC, b
Cooper's hawk	*Accipiter cooperii*	
golden eagle	*Aquila chrysaetos*	BLMS, BGEPA, CAFP
northern harrier	*Circus cyaneus*	CASSC
osprey	*Pandion haliaetus*	
peregrine falcon	*Falco peregrines*	CAFP, BCC, b
prairie falcon	*Falco mexicanus*	
red-tailed hawk	*Buteo jamaicensis*	
sharp-shinned hawk	*Accipiter striatus*	
Swainson's hawk	*Buteo swainsoni*	CAT

Table 1
Avian Species Recorded during all Biological Resource Surveys Completed for the Alta East Project from May 2009 to June 1, 2011

Common Name	Scientific Name	Status
Others		
Anna's hummingbird	*Calypte anna*	
ash-throated flycatcher	*Myiarchus cinerascens*	
barn swallow	*Hirundo rustica*	
Bewick's wren	*Thryomanes bewickii*	
black-throated sparrow	*Amphispiza bilineata*	
blue-gray gnatcatcher	*Polioptila caerulea*	
Brewer's blackbird	*Euphagus cyanocephalus*	
Brewer's sparrow	*Spizella breweri*	
cactus wren	*Campylorhynchus brunneicapillus*	BCC, b
California gull	*Larus californicus*	
California quail	*Callipepla californica*	
California towhee	*Pipilo crissalis*	
Cassin's vireo	*Vireo cassinii*	
chipping sparrow	*Spizella passerina*	
chukar	*Alectoris chukar*	
cliff swallow	*Hirundo pyrrhondota*	
common grackle	*Quiscalus qiscula*	
common raven	*Corvus corax*	
Costa's hummingbird	*Calypte costae*	BCC, b
dark-eyed junco	*Junco hyemalis*	
dusky flycatcher	*Empidonax oberholseri*	
European starling	*Sturnus vulgaris*	
fox sparrow	*Passerella iliaca*	
great egret	*Ardea alba*	
greater roadrunner	*Geococcyx californianus*	
horned lark	*Eremophila alpestris*	
house finch	*Carpodacus mexicanus*	
house wren	*Troglodytes aedon*	
unidentified hummingbird		
ladder-backed woodpecker	*Picoides scalaris*	

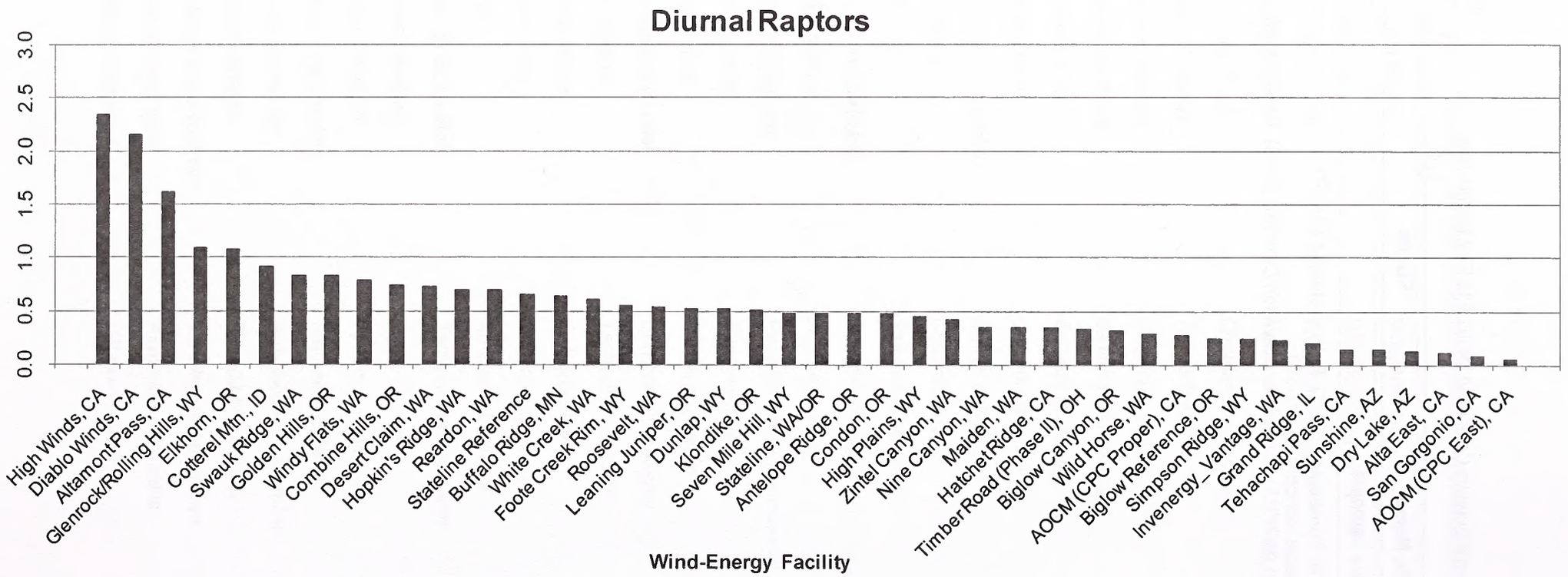
Table 1
Avian Species Recorded during all Biological Resource Surveys Completed for the Alta East Project from May 2009 to June 1, 2011

Common Name	Scientific Name	Status
lark sparrow	*Chondestes grammacus*	
Le Conte's thrasher	*Toxostoma lecontei*	BLMS, BLMSSC, CASSC, BCC, b
lesser goldfinch	*Carduelis psaltria*	
lesser nighthawk	*Chordeiles acutipennis*	
lesser yellowlegs	*Tringa flavipes*	
Lincoln's sparrow	*Melospiza lincolnii*	
loggerhead shrike	*Lanius ludovicianus*	CASSC, BCC, b
mourning dove	*Zenaida macroura*	
northern flicker	*Colaptes auratus*	
northern mockingbird	*Mimus polyglottos*	
rock pigeon	*Columba livia*	
rock wren	*Salpinctes obsoletus*	
ruby-crowned kinglet	*Regulus calendula*	
sage sparrow	*Amphispiza belli*	
savannah sparrow	*Passerculus sandwichensis*	
Say's phoebe	*Sayornis saya*	
Scott's oriole	*Icterus parisorum*	
Townsend's warbler	*Dendroica townsendi*	
tree swallow	*Tachycineta bicolor*	
turkey vulture	*Cathartes aura*	
Vaux's swift	*Chaetura vauxi*	CASSC
verdin	*Auriparus flaviceps*	
violet-green swallow	*Tachycineta thalassina*	
western bluebird	*Sialia Mexicana*	
western kingbird	*Tyrannus verticalis*	
western meadowlark	*Sturnella neglecta*	
western scrub-jay	*Aphelocoma californica*	
western tanager	*Piranga ludoviciana*	
white-crowned sparrow	*Zonotrichia leucophrys*	
white throated swift	*Aeronautes saxatalis*	
Wilson's warbler	*Wilsonia pusilla*	

Table 1
Avian Species Recorded during all Biological Resource Surveys Completed for the Alta East Project from May 2009 to June 1, 2011

Common Name	Scientific Name	Status
yellow-rumped warbler	*Dendroica coronate*	

*California: species of special concern (CASSC), Threatened (CAT), Fully protected (CAFP)
BLM: Sensitive Species (BLMS), species of special concern (BLMSSC)
USFWS: Bald and Golden Eagle Protection Act (BGEPA), Bird of Conservation Concern (BCC), Breeding (b)



Data from the following sources:

Wind Energy Facility	Reference	Wind Energy Facility	Reference
Alta East, CA	This study.		
High Winds, CA	Kerlinger et al. 2005	Stateline, WA/OR	Erickson et al. 2002b
Diablo Winds, CA	WEST 2006	Antelope Ridge, OR	WEST 2009
Altamont Pass, CA	Erickson et al. 2002b	Condon, OR	Erickson et al. 2002b
Glenrock/Rolling Hills, WY	Johnson et al. 2008a	High Plains, WY	Johnson et al. 2009b
Elkhorn, OR	WEST 2005a	Zintel Canyon, WA	Erickson et al. 2002a
Cotterel Mtn., ID	BLM 2006	Nine Canyon, WA	Erickson et al. 2001
Swauk Ridge, WA	Erickson et al. 2003a	Maiden, WA	Erickson et al. 2002b
Golden Hills, OR	Jeffrey et al. 2008	Hatchet Ridge, CA	Young et al. 2007a
Windy Flats, WA	Johnson et al. 2007	Timber Road (Phase II), OH	Good et al. 2010
Combine Hills, OR	Young et al. 2003c	Biglow Canyon, OR	WEST 2005d
Desert Claim, WA	Young et al. 2003b	Wild Horse, WA	Erickson et al. 2003c
Hopkin's Ridge, WA	Young et al. 2003a	AOCM (CPC Proper), CA	Chatfield et al. 2010c
Reardon, WA	WEST 2005b	Biglow Reference, OR	WEST 2005d
Stateline Reference	URS et al. 2001	Simpson Ridge, WY	Johnson et al. 2000
Buffalo Ridge, MN	Erickson et al. 2002b	Invenergy_Vantage, WA	WEST 2007
White Creek, WA	NWC and WEST 2005	Grand Ridge, IL	Derby et al. 2009
Foote Creek Rim, WY	Erickson et al. 2002b	Tehachapi Pass, CA	Erickson et al. 2002b
Roosevelt, WA	NWC and WEST 2004	Sunshine, AZ	WEST and the CPRS 2006
Leaning Juniper, OR	Kronner et al. 2005	Dry Lake, AZ	Young et al. 2007b
Dunlap, WY	Johnson et al. 2009a	San Gorgonio, CA	Erickson et al. 2002b
Klondike, OR	Johnson et al. 2002	AOCM (CPC East), CA	Chatfield et al. 2010a
Seven Mile Hill, WY	Johnson et al. 2008		

FIGURE 5
Comparison of annual raptor use between the Alta East Project and Other Wind Energy Facilities, using data collected at the Alta East Project from July 10, 2010 to June 1, 2011
Alta East Wind Project
Alta Wind Energy Center Project

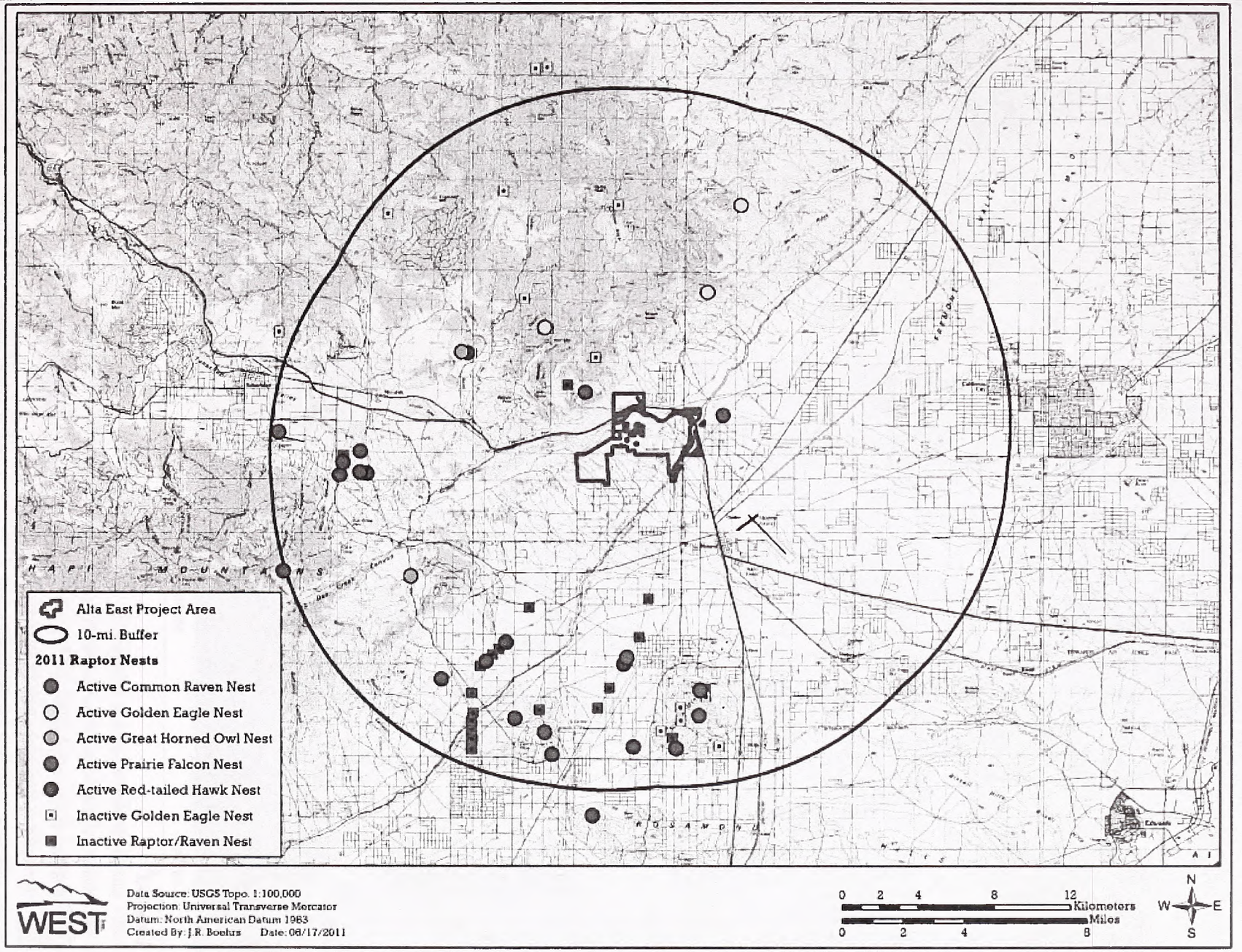


FIGURE 6
Results of Raptor Nest Survey Results Completed for the Alta East Project Area in 2011

Alta East Wind Project
Alta Wind Energy Center Project

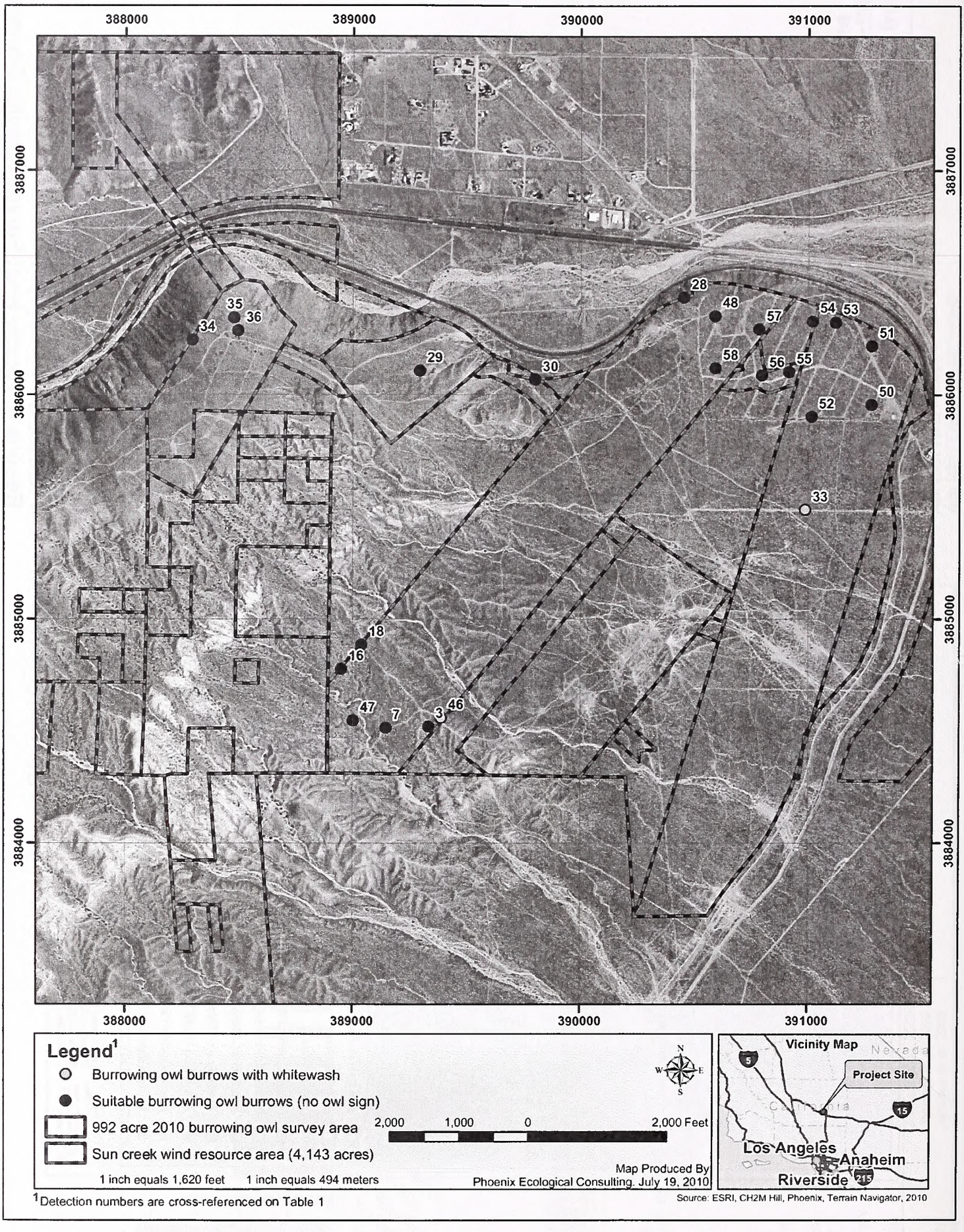


FIGURE 7
Results of Burrowing Owl Surveys completed for the Alta East Project Area from May 30-July 15, 2010

Alta East Wind Project
Alta Wind Energy Center Project

SECTION 3.0

3 Risk Assessment

3.1 Construction and Operations

Construction of the project will include installation of the WTGs, roads, underground electrical collector lines, a collector substation, an aboveground transmission line, a temporary construction laydown area, and an operations and maintenance building. Noise from the equipment would vary throughout the day with equipment use and location of construction, but would be reasonably expected to be as high as 95 A-weighted decibels (dBA) at the point of origin, attenuating to 63 dBA at 800 feet.

Operation of the project will comprise up to 120 operating WTGs, approximately 15 miles of aboveground 230-kilovolt (kV) transmission line, and 15 full-time-equivalent personnel, all of which present potential hazards to avian species potentially using the project area. Maintenance activities will occur regularly and will generally require only pick-up trucks travelling on project roads. When repairs are required, other vehicles, such as cranes and excavation equipment may be used.

The project area has no natural substrates for diurnal raptor nesting. Although no raptor nests are documented in the project area, nests in power poles are sometimes at risk of disturbance and nest abandonment if human activity levels increase following nest initiation. Potential diurnal raptor nesting habitat exists outside the project vicinity in the rugged topography located north of the project where rocky terrain could support cliff-nesting species, and potentially in Joshua tree or other treed habitats in the project vicinity. However, the proximity of these potential nests to project area activities indicates that they are highly unlikely to be disturbed if they exist. The project area currently provides suitable foraging and hunting habitat for raptors, but use is documented as low based on the avian use surveys completed to date. Although habitat functionality may be altered during and after construction, raptors might continue to forage or hunt in this area. Burrowing owl could currently use the project area for nesting, although no nesting territories have been documented in the project area. During year 2 studies, no burrowing owls were observed onsite; however, one burrowing owl was recorded near avian survey point 2 on March 19, 2010, coincidentally near the burrowing owl sign located during the burrowing owl survey as described in Section 2.2.4.

Habitats used by the avian species documented on the project site, as well as other species that may potentially occur but have gone undetected, would be disturbed by construction of the project. Habitat fragmentation could influence habitat functionality for some species, but more likely will simply reduce the density of affected birds proportional to the amount of habitat lost. Habitat fragmentation may exacerbate the problem of habitat loss for birds by decreasing patch area and increasing edge habitat, potentially reducing avian productivity through increased nest predation and brood parasitism, and reducing pairing success of males in some species. However, the construction of Alta East is not likely to significantly increase the degree of habitat fragmentation of the area because the majority of the wind

farm is located on habitat that is already fragmented due to the roads, trails and multiple uses within the area. Potential habitat fragmentation resulting from minimized through avoidance and minimization measures taken during the design, construction, and operational phases of the Project, the most significant of which include minimization of habitat disturbance, burial of collector lines, and using existing roadways where possible.

Shrub and ground-nesting species, as well as their nests and young, could be at risk during vegetation removal and ground-disturbing activities during construction (to the extent it occurred during the nesting season), and disturbance during construction would displace birds from the project site and surrounding area. In addition to being at risk of collision with vehicular travel during project construction and operation, raptors and other bird species could be susceptible to injury or mortality from collision with rotating WTG blades and transmission lines, electrocution from contact with the electrical conductors, and displacement from nests or nesting habitat.

During and following construction, only a small portion of the project area will be converted to developed lands that will be unsuitable for avian use. The human activity within and around the project structures may deter some birds from nesting in the project area; however, human activity and vehicle traffic are typically so minor that most avian species would be unaffected by such activity during project operation. Additionally, placement of project features, such as transmission lines and WTGs, can influence risk of impact on avian species. These risk factors are present and are therefore considered in AWD's assessment of risk from the avian use and raptor nest survey data.

3.2 Collision Risk

Bird density, age, residency status and season, flight style, interaction with other birds, and presence of foraging opportunities all may influence the likelihood of birds colliding with a WTG or other project feature. The majority of birds detected at the Alta East project site were passerines, and over 94 percent of the passerines were documented below the rotor swept area during the May 2009 to May 2010 studies. Although migrant passerines have been found more frequently in fatality studies than other bird groups (Arnett et al., 2007), they also occur at substantially higher numbers than other bird groups. And, although nocturnal migrants may be at greater risk than resident birds, Erickson (2007) used radar data and mortality monitoring to estimate that less than 0.01 percent of migrant songbirds that pass over wind projects are killed.

Western EcoSystems Technology, Inc. (WEST) analyzed exposure risk in detail using the first year of data collected for the site and concluded that with exception of turkey vultures and ravens, most non-raptors had relatively low exposure indices due to low use estimates and/or the majority of individuals flying below the rotor-swept height (Chatfield et al., 2010a). The only sensitive bird species with an exposure index greater than zero was Vaux's swift, in year 1. Due to the fact that very few nonraptor species were observed in the rotor swept area (RSA), and no nonraptor USFWS designated Birds of Conservation Concern species were observed in the RSA, it is extremely unlikely that non-raptor populations will be adversely affected by direct mortality from the operation of the wind energy facility. Similarly, WEST analyzed raptor use for this period and, based on comparisons with other projects in California, fatality rates of raptors are expected to be lower than the fatality rates

observed at other facilities. These results and conclusions are consistent with the year 2 data collected to date, in which year round mean raptor use was 0.12 raptor/20 minute point count, yielding a predicted fatality rate of less than 0.01 fatalities/MW/year, or less than 3 raptors/year for a 300 MW project.

Field data analyzed to date indicate that topographic features within the project area are not conducive to slope soaring or creation of potential flight corridors for any bird species. Turbines have been moved from the area of rugged topography located to the north and northwest where orographic uplift would be probable, and where higher incidence of golden eagle observations were recorded in year 1. The low levels of documented use by all bird species suggest that bird density is very low and migration corridors or stopover habitat are not present onsite. No foraging sites, roost sites, or perch structures have been identified for raptors and, although minor raptor use is documented within the project area during baseline studies, the actual risk of collision with proposed WTGs appears to be very low for raptors. Six WTGs planned in the northernmost parcel of the project north of Highway 58 are associated with ridgelines and may pose greater risk to species that rely on orographic lift for soaring; however, the majority of the WTGs are planned for installation in lower elevation, less rugged areas.. Based on low avian use of the project site the two years of diurnal avian use studies completed to date, it is appropriate to conclude that potential collision risk to birds is very low and would be unlikely to be significant at the population level, with the possible exception of some BCC listed species.

Avian species are known to be at risk because of collisions with power lines (i.e. Drewitt and Langston, 2006; Janss, 2000) and other project-related features. Fatal collisions can occur when birds collide with transmission and distribution wires, transmissions tower guy wires, and other structures associated primarily with electrical power transmission (CEC, 2002). The number of collisions that occur is not related to flight frequency (Rusz et al., 1986) but instead is due to a bird's flight performance (Savereno et al., 1996). Density, age, residency status, season, flight style, interaction with other birds, and hunting or presence of foraging opportunities all may influence the likelihood of a bird colliding with a power line or other project features.

The project area is within the Pacific Coast Migratory Route; migratory birds moving northwest from Mexico into California and the Pacific northwestern United States utilize this route (USGS, 2006). There are no prominent agricultural fields in the project area, nor are there wetlands or riparian features that would attract avian species and potentially increase collision risk. Based on the habitat characteristics and the avian data collected to date, it would be unlikely that large numbers of any species would utilize or be supported by the habitats present in and near the project site.

3.3 Electrocution Risk

Power lines are present in many wildlife habitats and can result in the electrocution of raptor and other bird species (Lehman et al., 2010; and references therein). Electrocutions are caused by the arrangement and spacing of energized and grounded components of poles and towers that are use for perching and other activities (Avian Power Line Interaction Committee [APLIC], 2006). However, nearly all electrocutions occur on residential and commercial electrical distribution lines that are less than 69 kV (APLIC, 2006). The 230-kV

transmission line planned for this project will have clearances between electrical components that are greater than 60 inches, as recommended by APLIC (2006), which is greater than the physical dimensions of all large birds that would potentially use the transmission structures for perching with the possible exception of California condor.

To protect avian species from electrocution, the APLIC has established guidelines to reduce this risk. Incorporating appropriate design standards into the project, such as 60 inches of horizontal separation and a vertical separation of 40 inches between phase conductors and/or grounded hardware, will reduce electrocution risk. In the event that adequate separation is not feasible, insulation or covering of phases and grounds will be used to ensure avian protection from electrocution. Examples of insulation or covering are phase covers, bushing covers, jumper wire hoses, and covered conductors. Thus, electrocution of raptors on this project's transmission line would be highly unlikely. Additionally, design measures will be incorporated to prevent perching by raptors, which will further reduce the attractiveness of the transmission line for species that use transmission line structures for perching or nesting.

3.4 Impacts on Nests or Nesting Territories

Areas proposed for installation of project components may potentially support suitable nesting habitat for burrowing owl and other avian species associated with the vegetation types present on the project, and these species potentially could be affected during construction and operation activities. Bird nesting could also occur in vegetation (particularly shrubby plants) and in ground burrows on or near the project site. In the project vicinity, the avian nesting season for most bird species is from late February to early July.

No raptor nests were located within 1 mile of any proposed project feature; therefore, direct disturbance of raptor nests will not occur and indirect disturbance associated with human activity in proximity to these nests is extremely unlikely. Ground- or shrub-nesting non-raptor bird species would, however, be vulnerable to construction activities during the nesting season. Active burrowing owl nests were not observed within the project area, although potential habitat is present in the project area and along the transmission line corridor. The project area could also provide foraging habitat for other raptor species.

3.5 Nocturnal Migration

Nighttime visibility data available for the area suggest that risk of nocturnal avian fatality during migration is low because of infrequent low visibility events that are associated with bird strike risk. Historical visibility information within the region of the project site was accessed through airport Automated Surface Observing System (ASOS) and Automated Weather Observation System databases to assess the frequency of occurrence of low visibility conditions that could increase risk to birds from the project. Data from all 24 hours of the day were collected from the nearest reporting station near Edwards AFB, CA from January 1, 2006 through December 31, 2009 (Table 2). Current reportable ASOS values of visibility in statute miles are: <1/4, 1/4, 1/2, 3/4, 1, 11/4, 11/2, 13/4, 2, 21/2, 3, 4, 5, 6, 7, 8, 9, 10+. For avian risk assessment, low visibility resulting in bird strike risk would

reasonably be defined as visibility of less than 1/3 mile; however, AWD uses 1/2 mile as the threshold value for low visibility to be more conservative than what would seem biologically appropriate. Using 1/2 mile as the threshold for low visibility, this area reported only 590 hours (1.8%) of visibility conditions less than ½ mile.

TABLE 2
Summary of Historical Visibility Data

Weather Station	Date Range	Number of Observation Hours	Number of Hours With Visibility Less Than ½ mile	Percentage
HRL (Valley International	1/1/2006 - 1231/2009	33,540	590	1.76

AWD is not aware of any significant fatality events involving nocturnal migrants in the region. Nocturnal migrants typically fly at altitudes well above the rotor-swept area unless ascending or descending in response to available stopover habitats. The largely uninterrupted expanse of land mass with relatively uniform vegetative cover present in and near the project area does not contain topographical scenarios that would concentrate migrations into narrow and obvious pathways.

3.6 California Condor

The California condor was federally listed as an endangered species by USFWS in 1967 (32 Federal Register 4001) and is designated fully protected under California law. A Biological Assessment has been drafted to evaluate the potential effect of the project on the species. The recommended conclusion is that the project may affect, and is not likely to adversely affect the species. Current threats to the California condor include low population numbers in the wild, mortality from ingesting lead from shotgun- and rifle-killed game, predation of newly released condors, and collisions with manmade structures, such as power lines (Southwest Condor Working Group, 2007). Condor fatalities have been documented as a result of ingestion of microtrash and hazardous materials such as ethylene glycol. No condor collision fatalities with meteorological towers, or wind turbines, have been reported. During the first 2 years of reintroduction, four condors were reported killed by transmission line collision/electrocution (Snyder and Snyder, 2000). Since 1995, condors have been receiving negative conditioning to discourage perching on transmission towers; however, occasional collisions/electrocutions are still reported.

There is a strong association of rugged topography with the presence of condor Global Positioning System (GPS) locations. Generally, the project area is away from these condor observations and is at a lower elevation, with flatter, less rugged topography. Thus, topography and wind characteristics of the project area may provide features that have less probability to be used by condors. Site-specific avian use data, collected for almost 2 years, indicates that currently condors are not using the project site. This conclusion is supported by current GPS data provided by USFWS, in which the nearest documented condor was located in the Tehachapi Mountains approximately 3.8 miles northeast of the project and a historical location approximately 2.3 miles west of the project site. Condors may use

adjacent areas north and west of the project site. Whether the geographic range of the condor will expand over the life of the project, or whether the landscape-level patterns of use will change to include the project area over the life of the project, is unknown at this time, but there is no habitat or other features on the site identified by AWD that are known attractions for condors.

3.7 Cumulative Impacts

Typical activities that may be disruptive or detrimental to avian species occurring throughout the project region, although very limited within the project area, include illegal shooting, loss of habitat to development through wind and non-wind industry-related development, and general encroachment into avian habitats, each of which could potentially contribute to negative impacts on the regional avian populations. However, implementation of best management practices (BMPs) designed specifically to avoid and minimize potential impacts on avian species will reduce the likelihood of any cumulative impacts associated with the project.

SECTION 4.0

4 Avoidance, Minimization, and Mitigation Measures

The analyses and documentation provided in this APP show the project is well sited; however, it does present some risk to avian species using the project area. This risk is low; however, adequate baseline studies have been completed to avoid and minimize site-specific threats through siting, and construction and operation measures. Additionally, mortality monitoring during operation will allow ongoing assessment of loss, enabling documentation of species composition and fatality rates. Avoidance and minimization measures are presented in the following sections.

4.1 Project Siting

Avian use and raptor nesting was evaluated during baselines studies for the project area in 2009 and 2010. The project site was modified in June 2010 to include additional areas, extending development southward from the rugged topographical areas that seemed to provide conditions more suitable for raptor nesting and use of thermals than the flat, nonrugged topography comprising the current area proposed for development. The project includes repowering a historical wind power project site north of SR 58 on BLM lands and infilling existing wind facilities south of SR 58 in the area of Cameron Ridge.

The project location allows AWD the opportunity to avoid impacts on federal or state-listed avian species, as well as other important resource areas such as BLM Areas of Critical Environmental Concern or USFWS Designated Critical Habitat. No known areas of breeding, concentrated winter use, or migratory concentrations are documented in or near the project site. Raptor use was highest during winter, and passerine use is highest during spring (followed by winter), but these use values are very low. The data collected shows no evidence of concentrated winter or migratory use. Additonally, lower visibility conditions caused by fog, mist, and low clouds that would present high risk to avian species are infrequent in the area. Overall, the project area presents a very low risk of direct impacts and the potential for very minor indirect impacts on birds. The project is appropriately sited on the landscape as it relates to the risk of impact on avian species.

4.2 Micrositing of Project Features

Baseline surveys for the project resulted in no areas of unique or high use by avian species. Although some avian use of the project area will occur during construction and operation, no unique habitat features such as prominent raptor perch sites (rock outcrops, cliffs, trees) or unique concentrations of prey were detected during any biological resource studies performed on the project area that would attract predatory avian species are evident. Additionally, the areas where raptor nests are documented are at sufficient distance from the project site to avoid direct disturbance or displacement impacts on nesting raptors.

Additionally, Cameron Ridge, in the western portion of the project site and south of SR 58, has operating WTGs along the ridge. The ridge may have provided historical perch locations for raptors prior to development, but now this ridge presents existing wind development.

All other project features are located away from the higher elevation and rugged topography that would be potentially associated with higher raptor use and/or provide potential to concentrate movements of migratory species. Habitats are generally expansive and regionally common, with 87 percent of the area composed of four types: California buckwheat scrub (27 percent), Joshua tree woodland (23 percent), California juniper woodland (22 percent), and brittlebush scrub (15 percent); therefore, use by smaller birds will be affected but direct impacts to individuals and nests will be minimized and avoided through the following construction-related measures. Therefore, micrositing in response to avian use or habitat is not necessary for the remainder of the project features.

The following design features will be built into the project as a means to reduce risk:

- WTGs will generally be grouped in parallel linear arrangements.
- Electrical collector lines will be located underground wherever feasible.
- The following APLIC (2006) design guidelines will be applied for overhead transmission lines by incorporating recommended or other methods that enhance the visibility of the lines to avian species:
  - Provide 60-inch minimum horizontal separation between energized conductors and/or energized conductors and grounded hardware.

4.3 Construction Measures

Appropriate site-specific avoidance and minimization measures have been identified by AWD and include, but may not be limited to, measures specified in the following BMPs. These measures are consistent with those identified in BLM right-of-way grants received by AWD on nearby wind development projects, and applicable measures from the adjacent Alta-Oak Creek Mojave project. All potentially applicable measures from the above references are listed below. The BLM *Wind Energy Programmatic Environmental Impact Statement* also includes BMPs and mitigation measures for a plan of development and project design.

Because raptor nesting areas are not located in the project vicinity, construction activities would not need to be scheduled to avoid important periods of courtship or nesting. If new nests are detected during project construction, timing and avoidance measures would be implemented as appropriate in coordination with USFWS.

4.3.1 Minimizing Potential Habitat Disturbance

To mitigate habitat reduction or alteration during construction, the following measures may be implemented:

- Where applicable, the extent of habitat disturbance would be reduced by keeping vehicles on access roads and minimizing foot and vehicle traffic through undisturbed areas.
- Habitat restoration activities would be initiated as soon as possible after construction activities are completed.
- Appropriate control measures will be implemented to control the introduction and spread of non-native plants, as specified by the project's Noxious Weed Management and Habitat Rehabilitation plans, which will reduce impacts on the quality of avian habitats.
- Existing roads and utility corridors will be used to the maximum extent feasible.
- Potential for creating temporary or permanent habitats suitable for rodents, such as rock piles, eroded slopes with openings or overhangs, or stockpiling of construction debris will be avoided.
- The potential for wildfire will be minimized by implementing safety measures in accordance with the requirements of the California Fire Code (California Code of Regulations, Title 24, Chapter 4, Emergency Planning and Preparedness).

4.3.2 Minimizing Potential Direct Disturbance

- Permanent meteorological towers, transmission towers, and other facility structures would be designed to discourage birds from perching or nesting on them (for example, non-lattice towers, APLIC [2006] standards).
- Guy wires installed on project structures, such as temporary meteorological towers, will be marked with bird flight diverters. Meteorological towers placed on BLM lands would adhere to BLM Guidelines
- Permanent meteorological towers will be free-standing without the use of guy wires.
- Power lines would be configured to minimize the potential for electrocution of birds, by following established guidelines (for example, APLIC, 2006).
- Explosives would be used only within specified times and at specified distances from sensitive wildlife or surface waters as established by BLM.
- If any federally listed species is injured or killed during construction, AWD will immediately notify USFWS
- Vegetation removal and initial ground disturbance will be timed to occur outside the nesting season (August 1 through March 1) to reduce potential for direct disturbance of ground- or shrub-nesting species.
- If vegetation must be cleared during the nesting season (March 1 through August 1), a qualified biologist will conduct a pre-construction sweep of the area proposed for disturbance. The biologist will inspect the area for nests, or signs of nesting or courtship behavior. If a nest or sign of nesting is discovered, measures such as altering the timing

of construction or distance of construction activity from the nest will be taken to ensure that no impacts on these nests or individuals occur during construction.

- A Raven Management Plan will be prepared to provide instructions on how to avoid and minimize providing subsidies to common ravens in the project area.
- AWD will provide environmental training to all personnel working on the site during project construction. The training will include a review of federally protected species identification and promote awareness and facilitate implementation of appropriate measures to minimize risk of impacts on avian species.

4.4 Operation Measures

As part of AWD's mortality monitoring and reporting program, AWD will provide environmental training to all personnel working onsite during project operation. The training will include a review of federally protected species identification and to teach appropriate avoidance and minimization measures, as well as response measures if dead or injured avian species are found. The importance of onsite staff is significant in that they are onsite daily, can become familiar with how all wildlife move through and use the project site and vicinity, are the eyes and ears of environmental staff for identifying project risk or impact issues, and can help identify ways to reduce unexpected impacts if they are detected.

- Onsite management efforts will reduce attractants to predatory and scavenging species, such as avoiding creation of attractive features for prey and removing carrion (livestock carcasses).
- Outdoor lighting will be limited to that necessary for facility safety and security, using motion and infrared sensors when appropriate and practical, and lights will be focused downward whenever possible to reduce skyward illumination.
- Informal operational monitoring will be performed during the life of the project as a course of business by all AWD operations staff. Staff will be required to report all avian fatalities and observations of nesting behavior. While this monitoring will not be statistically based, it will allow detection of issues that may potentially occur onsite.
- Formal operational monitoring and reporting measures will also be implemented and are described in detail in Section 5.0, Post-construction Monitoring.

4.5 Condor Mitigation Measures

AWD has proposed a comprehensive California Condor Mitigation Strategy for its projects located in the Tehachapi area. In order to effectively protect and manage the California condor within the area, AWD proposes to create a Condor Preservation Foundation (hereafter, the Foundation). Companies proposing wind energy facilities in the Tehachapi area would be required by Kern County to contribute to the Foundation. The advantages of establishing a foundation are that it can more effectively protect the California condor and implement the mitigation strategies outlined below than could be accomplished on a project-by-project basis. The Foundation, for example, can reach a wider audience for public outreach and education, focus its efforts on research and funding, employ condor biologists,

operate a carcass management plan over an area that encompasses all future and potentially existing projects, and develop an effective and widespread condor supplemental feeding program. Eventually, the Foundation could purchase and manage condor conservation lands.

A draft Condor Mitigation Strategy Plan is included as Appendix A, and presents the details proposed by AWD. The suggested mitigation strategies presented in the plan are grouped into six major categories, listed roughly in descending order of importance. For details on each strategy, please refer to the draft plan (Appendix A). The California condor will be addressed in detail through the ESA Section 7 process and measures resulting from that consultation process will be incorporated into avian protection planning. However, strategies 1 through 4 below directly address the causes of decline for the species.

1. Elimination of lead bullet fragments and lead shot from the current and future range of the California condor in California
2. Implementation of a carcass management and supplemental feeding program
3. Support for the California condor recovery plan
4. Funding for California condor research and education programs
5. Hiring of a full-time biologist

4.6 Compensation for Habitat Loss

AWD will address direct impacts to and loss of avian habitat through the conservation measures to be determined as part of incidental take permitting for state protected species and as a result of Section 7 consultation under the ESA.

SECTION 5.0

5 Post-construction Monitoring

Post-construction monitoring will enable AWD to document avian fatalities if they occur and identify factors associated with fatalities that might warrant additional or improved measures, or might warrant elimination of BMPs found to be ineffective. As part of AWD's mortality monitoring and reporting program, AWD will complete post-construction monitoring and reporting to determine whether baseline predictions of low levels of avian fatality are consistent with operational outcomes. The monitoring program is explained below.

5.1 Fatality Studies

AWD or its representatives will perform post-construction avian mortality monitoring in the first, third, and fifth years following the initial operation of the project. Post-construction mortality monitoring will include a mortality analysis, which will be conducted as follows:

- AWD will provide USFWS with the results of the mortality study annually. A qualified biologist will conduct mortality monitoring using a statistically significant sample size of operational turbines within the project area, not to exceed 33 percent of the WTGs.
- All eagle and federally listed species fatalities will be reported to USFWS within 24 hours of detection.
- The mortality analysis will note species number, location, distance from the turbine, and apparent cause of mortality for each recovered species.
- The mortality monitoring will follow standardized guidelines outlined by the CEC (2007) and will include carcass scavenging and searcher efficiency trials.If improved field or data analyses methods become generally accepted practice by the wind and wildlife scientific community, and are deemed acceptable by AWD's avian biologist's, such most methods will be implemented for the project.
- The results of the mortality analysis will be provided to USFWS. At a minimum, the mortality analysis will:
  - Estimate number of annual avian mortalities per turbine
  - Consider a comparison to existing data on wind-energy-project-related avian mortality in the region, if available
- If after the post-construction mortality monitoring is completed during first, third, or fifth year of operation, data indicate that the project is resulting in inappropriate levels of impacts on avian species, AWD will consult with USFWS as described in Section 6.0, Adaptive Management.

5.2 Nesting/Breeding Monitoring

- AWD or its representative will conduct post-construction breeding monitoring of raptor nests within 2 miles of the project site in the first and third years following the project's initial operation. Post-construction breeding monitoring will include aerial surveys or ground surveys where access is available. Survey results will be provided annually to USFWS.
- If the project results in a level of incidental injury and mortality to nesting raptors that constitutes levels of take that might influence productivity of a species, AWD will undertake supplemental compensatory measures that are commensurate with the impacts identified, to support regional conservation of that species in accordance with measures presented in Section 6.0, Adaptive Management.

SECTION 6.0

6 Adaptive Management

6.1 Accounting for Policy Changes

With the possibility of future implementation of new policies it is understood that commitments made in this Plan may require adaptation relative to potential forthcoming guidance. AWD will work collaboratively with USFWS to apply necessary policy changes to the project ABPP.

6.2 Agency Coordination

To ensure that impacts on avian species do not reach levels of significance during project operation or result in a net loss of avian species in the regional population, study results will be provided to USFWS on an annual basis.

6.3 Implementing Adaptive Management

Results and work products produced throughout the permitting process will be used to guide management decisions that are made in the development process but extend beyond development and into all phases of construction, operations, repowering, and decommissioning. The foundation for guiding management decisions made during the development process should be well-founded and science-based risk assessments. This work will establish a baseline for identifying the need for future actions that may be required to avoid, minimize or mitigate impacts to avian and bat species. Well founded risk assessment and forecasted avian and/or bat mortalities will be evaluated by TGP Environmental Managers periodically to determine if assumptions and forecasts used to predict mortality were correct. If unexpected levels of mortality are determined to exist at the project site, corrective actions will be evaluated to avoid, minimize or mitigate for the impacts. Implementing a system by which mortality risk assessments established during the development of a project are monitored during the operation of a project allows TGP to potentially modify operations for long-term reductions in avian and bat mortality.

Uncertainty in mortality predictions from work performed within the permitting process should establish the first step necessary to establish a feed-back loop that may identify the need for, and actions taken to, address unexpected mortality. Modifications made in response to monitoring operational mortalities and comparing them to predictive morality is the foundation of adaptive management. Adaptive management should be considered at the project site where observed avian or bat mortality is significantly inconsistent with predicted mortality.

6.4 Mortality Reduction and Conservation Measures

Mortality predictions and avian and bat risk assessments performed in the permitting process will be used in conjunction with any agency requirements among other factors including but not limited to economic considerations to determine if adaptive management is necessary. Observed mortality will be monitored and by operations staff in accordance with TGP's operational monitoring and reporting protocols.

TGP acknowledges the importance of understanding potential impacts to avian and bat species during the operation of wind energy projects. Adaptive management will be implemented to avoid, minimize, and mitigate for unexpected impacts in accordance with state, federal, and local laws pertaining to the protection of avian and bat species.

Adaptive management assessment techniques will be incorporated to assess the level of unexpected avian or bat mortalities. Observed mortalities will be evaluated for the likely causes of mortality and possible mortality reduction coordinated with the appropriate state, and federal agencies. Conservation measures will be implemented to address the cause of the mortality. Details of conservation measures will be determined from site specific assessment and will focus on reducing mortality relative to what has been observed.

6.5 Supplemental Measures

If the avoidance, minimization, and mitigation measures proposed in Section 4.0 have not been sufficient in reducing project impacts to an acceptable level, the supplemental measures listed below may be considered for implementation. Mitigation measures would be incorporated to this APP in response to specific issues identified during post-construction monitoring and may include such actions as:

- Upgrade existing power lines following APLIC guidelines to reduce the risk of electrocution.
- Provide assistance with a conservation project.
- Provide opportunities to enhance avian populations through enhancement techniques, such as creating nesting platforms, such as poles or nesting boxes, or habitat improvements for migratory birds on conservation lands or nearby BLM-administered land.

6.6 California Condor

Although wandering California condors may occur in the project area, the frequency of this occurring is expected to be extremely low based on the results of the avian studies and evaluation of existing data for the project. Based on the baseline data collected for the project, the likelihood of occurrence of California condors is low to nonexistent in or near the project area at this time, making the current probability of collision fatality close to zero.

If California condors are detected in or near the project area during the life of the project using radar or observational techniques, and are determined to be at risk of collision, or if condors are injured or killed by the project, AWD will immediately coordinate with USFWS

to effectively address the issue. Advanced conservation practices and/or mitigation to address the loss would be incorporated into this APP and may include the following actions:

- Further evaluation and management of forage resources to identify areas posting greatest risk.
- Operational modifications to reduce likelihood of loss of condor.
- Implementation of collision deterrents and/or features to increasing detectability of WTGs by condors, such as colored or marked blades, pylons at the end of WTG arrays, acoustic deterrents (hazing) or other means considered feasible for preventing condor impacts.

SECTION 7.0

7 References

Arnett, E. B., D. B. Inkley, D. H. Johnson, R. P. Larkin, S. Manes, A. M. Manville, J. R. Mason, M. L. Morrison, M. D. Strickland, and R. Thresher. 2007. Impacts of Wind Energy Facilities on Wildlife and Wildlife Habitat. Wildlife Society Technical Review 07-2. The Wildlife Society, Bethesda, Maryland, USA

Avian Power Line Interaction Committee (APLIC). 2006. Suggested practices for avian protection on power lines: the state of the art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington D.C. and Sacramento, CA, USA. http://www.aplic.org/SuggestedPractices2006(LR-2watermark).pdf.

Bureau of Land Management (BLM). 2006. Final Environmental Impact Statement for the Proposed Cotterel Wind Power Project and Proposed Resource Management Plan Amendment. FES 06-07. Serial No. IDI-33676. Prepared for the US Department of the Interior (USDOI), BLM, Twin Falls District, Burley Field Office, Cassia County, Idaho, on behalf of Windland, Inc., Boise, Idaho, and Shell WindEnergy Inc., Houston, Texas. March 2006.

California Burrowing Owl Consortium (CBOC). 1993. *Burrowing Owl Survey Protocol and Mitigation Guidelines.* April.

California Department of Fish and Game (CDFG). 2009. California Natural Diversity Database. Web site: http://www.dfg.ca.gov/biogeodata/cnddb/

California Energy Commission (CEC). 2002. *A Roadmap for PIER Research on Avian Collisions with Power Lines in California.* California Energy Commission Staff Report. December.

California Energy Commission (CEC). 2007. *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development.* CEC-700-2007-008-CMF. October.

CEC and CDFG. 2010. *Swainson's Hawk Survey Protocols, Impact Avoidance, and Minimization Measures for Renewable Energy Projects in the Antelope Valley of Los Angeles and Kern Counties, California.* June 2.

California Native Plant Society (CNPS). 2009. Inventory of Rare and Endangered Plants. Web site: http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi.ca/pdf/pdfs/cdd_pdfs/wemo_pdfs.Par.4dfb777.file: wemo_rod_3-06.pdf

Chatfield, A., W. P. Erickson, and K. Bay. 2010a. *Wildlife Baseline Studies for the Sun Creek Wind Resource Area, Kern County, California. Final Report: May 2009 – May 2010.* Prepared for CH2M HILL, Oakland, California. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Chatfield, A., W. P. Erickson, and K. Bay. 2010b. *Baseline Avian Studies for the Alta East Wind Resource Area, Kern County, California. Interim Report, July 10 – August 31, 2010.*

Chatfield, A., W. P. Erickson, and K. Bay. 2010c. *Baseline Avian Studies for the Alta East Wind Resource Area, Kern County, California, Summer- Fall Interim Report, July 10 – November 12, 2010.*

Derby, C., K. Bay, and J. Ritzert. 2009. Bird Use Monitoring, Grand Ridge Wind Resource Area, La Salle County, Illinois. Year One Final Report, March 2008 - February 2009. Prepared for Grand Ridge Energy LLC, Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. July 29, 2009.

Drewitt, A.L., and R.H.W. Langston. 2006. Assessing the Impacts of Wind Farms on Birds. *Ibis* 148:29-42.

Erickson, W.P., E. Lack, M. Bourassa, K. Sernka, and K. Kronner. 2001. Wildlife Baseline Study for the Nine Canyon Wind Project, Final Report May 2000-October 2001 Technical report prepared for Energy Northwest, Richland, Washington.

Erickson, W.P., G.D. Johnson, K. Bay, and K. Kronner. 2002a. Ecological Baseline Study for the Zintel Canyon Wind Project. Final Report April 2001 – June 2002. Technical report prepared for Energy Northwest. Prepared for Energy Northwest by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. June 2002.

Erickson, W.P., G.D. Johnson, D.P. Young, Jr., D. Strickland, R. Good, M. Bourassa, K. Bay, and K. Sernka. 2002b. Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments. Technical report prepared for Bonneville Power Administration, Portland, Oregon by WEST, Inc., Cheyenne, Wyoming. December 2002.
http://www.bpa.gov/Power/pgc/wind/Avian_and_Bat_Study_12-2002.pdf

Erickson, W.P., J. Jeffrey, D.P. Young, Jr., K. Bay, R. Good, K. Sernka, and K. Kronner. 2003a. Wildlife Baseline Study for the Kittitas Valley Wind Project: Summary of Results from 2002 Wildlife Surveys. Final Report February 2002– November 2002. Prepared for Zilkha Renewable Energy, Portland, Oregon, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. January 2003.

Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2003b. Stateline Wind Project Wildlife Monitoring Annual Report, Results for the Period July 2001 - December 2002. Technical report submitted to FPL Energy, the Oregon Office of Energy, and the Stateline Technical Advisory Committee. Western EcoSystems Technology, Inc., Cheyenne, Wyoming. May 2003.

Erickson, W.P., D.P. Young, G. Johnson, J. Jeffrey, K. Bay, R. Good, and H. Sawyer. 2003c. Wildlife Baseline Study for the Wild Horse Wind Project. Summary of Results from 2002-2003 Wildlife Surveys May 10, 2002- May 22, 2003. Draft report prepared for Zilkha Renewable Energy, Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. November 2003.

Erickson, W. P. 2007. Summary of Methods and Results for Prediction and Estimation of Impacts and Risk. Presented at NWCC Probability of Impact Workshop, 13 November 2007, Golden, CO.

Good, R.E., M. Ritzert, and K. Bay. 2010. Wildlife Baseline Studies for the Timber Road Phase II Wind Resource Area, Paulding County, Ohio. Final Report: September 2, 2008 - August 19, 2009. Prepared for Horizon Wind Energy, Houston, Texas. Prepared by Western EcoSystems Technology, Inc. (WEST), Bloomington, Indiana. April 28, 2010.

Janss, G. F. E. 2000. "Avian Mortality from Power Lines: A Morphologic Approach of a Species-Specific Mortality." *Biological Conservation.* 95 (2000): 353-359.

Jeffrey, J.D., W.P. Erickson, K.J. Bay, V.K. Poulton, W.L. Tidhar, and J.E. Baker. 2008. Wildlife Baseline Studies for the Golden Hills Wind Resource Area, Sherman County, Oregon. Final Report May 2006 – October 2007. Prepared for BP Alternative Energy North America Inc., Houston, Texas, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Johnson, G.D., D.P. Young, W.P. Erickson, C.E. Derby, M.D. Strickland, and R.E. Good. 2000. Wildlife Monitoring Studies, Seawest Windpower Plant, Carbon County, Wyoming, 1995-1999. Final report prepared for SeaWest Energy Corporation, San Diego, California, and the Bureau of Land Management, Rawlins, Wyoming, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. August 9, 2000. http://www.west-inc.com and http://www.west-inc.com/reports/fcr_final_baseline.pdf

Johnson, G.D., W.P. Erickson, K. Bay, and K. Kronner. 2002. Baseline Ecological Studies for the Klondike Wind Project, Sherman County, Oregon. Final report prepared for Northwestern Wind Power, Goldendale, Washington, by Western EcoSystems Technology, Inc. (WEST) Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. May 29, 2002.

Johnson, G.D., J. Jeffrey, J. Baker, and K. Bay. 2007. Baseline Avian Studies for the Windy Flats Wind Energy Project, Klickitat County, Washington. Prepared for Windy Point Partners, LLC., by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. May 29, 2007.

Johnson, G.D., K. Bay, J. Eddy, and T. Rintz. 2008a. Wildlife Baseline Studies for the Glenrock Wind Resource Area, Converse County, Wyoming. Prepared for CH2M HILL. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Johnson, G.D., J. Eddy, K. Bay, and A. Chatfield. 2008b. Wildlife Baseline Studies for the Seven Mile Hill Wind Resource Area, Carbon County, Wyoming: April 30 - November 15, 2007. Prepared for CH2M HILL, Englewood, Colorado. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Johnson, G.D., K. Bay, and J. Eddy. 2009a. Wildlife Baseline Studies for the Dunlap Ranch Wind Resource Area, Carbon and Albany Counties, Wyoming. June 4, 2008 - May 27, 2009. Prepared for CH2M HILL, Englewood, Colorado. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Johnson, G.D., K. Bay, and J. Eddy. 2009b. Wildlife Baseline Studies for the High Plains Wind Resource Area, Carbon and Albany Counties, Wyoming. Prepared for CH2M HILL. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Kerlinger, P., L. Culp, and R. Curry. 2005. Post-Construction Avian Monitoring Study for the High Winds Wind Power Project, Solano County, California. Year One Report. Prepared for High Winds, LLC and FPL Energy.

Kronner, K., B. Gritski, J. Baker, V. Marr, G.D. Johnson, and K.Bay. 2005. Wildlife Baseline Study for the Leaning Juniper Wind Power Project, Gilliam County, Oregon. Prepared for PPM Energy, Portland, Oregon and CH2M HILL, Portland, Oregon by NWC, Pendleton, Oregon, and WEST, Inc., Cheyenne, Wyoming. November 3, 2005.

Lehman, R. N., J. A. Savidge, P. L. Kennedy, and R.E. Harness. 2010. Raptor electrocution rates for a Utility in the Intermountain Western United States. Journal of Wildlife Management 74(3): 459-470.

Northwest Wildlife Consultants, Inc. (NWC) and Western Ecosystems Technology, Inc. (WEST). 2004. Ecological Baseline Studies for the Roosevelt Wind Project, Klickitat County, Washington. Final Report. Prepared by NWC, Pendleton, Oregon, and WEST, Inc., Cheyenne, Wyoming. September 2004

Northwest Wildlife Consultants, Inc. (NWC) and Western Ecosystems Technology, Inc. (WEST). 2005. Ecological Baseline Studies and Wildlife Impact Assessment for the White Creek Wind Power Project, Klickitat County, Washington. Prepared for Last Mile Electric Cooperative, Goldendale, Washington, by Northwest Wildlife Consultants, Inc., Goldendale, Washington, and Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. January 12, 2005.

Phoenix Ecological Consulting. 2010. Burrowing Owl (*Athene cunicularia*) Protocol Presence/Absence Survey for Sun Creek Wind Resource Area, Kern County, California. July 19.

Reynolds, R. T., J. M. Scott, and R. A. Nussbaum. 1980. "A Variable Circular-Plot Method for Estimating Bird Numbers." *Condor* 82(3): 309-313.

Rusz, P. J., H. H. Prince, R. D. Rusz, and G. A. Dawson. 1986. Bird collisions with transmission lines near power plant cooling pond. *Wildlife Society Bulletin* 14, 441-444.

Savereno, A. J., L. A. Savereno, R. Boettcher, and S. M. Haig. 1996. "Avian Behavior and Mortality at Power Lines in Coastal South Carolina." *Wildlife Society Bulletin* 24, 636-648.

Snyder, N. F. R. and H. Snyder. 2000. *The California Condor: a saga of natural history and conservation*. Academic Press, San Diego, California.

Southwest Condor Working Group. 2007. Review of the Second Five Years of the California Condor Reintroduction Program in the Southwest. April. 87pp.

U.S. Bureau of Land Management (BLM). 1999. California Desert Conservation Area Plan of 1980. Amended 1999.

U.S. Bureau of Land Management (BLM). 2001. Special Status Species Management Manual 6840. Available online at: http://www.blm.gov/pgdata/etc/medialib//blm/ca/pdf/pdfs/pa_pdfs/biology_pdfs.Par.9d22a8ee.File.pdf/6840_ManualFinal.pdf

United States Geological Survey (USGS). 2006. *Migration of Birds: Routes of Migration.* Available at: http://www.npwrc.usgs.gov/resource/birds/migratio/routes.htm.

United States Fish and Wildlife Service (USFWS). 2008. Birds of Conservation Concern, 2008. USFWS Division of Migratory Bird Management. Arlington, Virginia. December. http://www.fws.gov/migratorybirds/NewReportsPublications/SpecialTopics/BCC2008/BCC2008.pdf

URS Corporation, Western EcoSystems Technology, Inc. (WEST), and Northwest Wildlife Consultants, Inc. (NWC). 2001. Avian Baseline Study for the Stateline Project. Prepared for FPL Energy Vansycle, LLC, Juno Beach, Florida.

Western Ecosystems Technology, Inc. (WEST). 2005a. Ecological Baseline Study at the Elkhorn Wind Power Project. Exhibit A. Final report prepared for Zilkha Renewable Energy, LLC., Portland, Oregon, by WEST, Cheyenne, Wyoming. June 2005.

Western EcoSystems Technology, Inc. (WEST). 2005b. Ecological Baseline Study for the Proposed Reardan Wind Project, Lincoln County, Washington. Draft Final Report. Prepared for Energy Northwest, Richland, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. June 2005.

Western EcoSystems Technology, Inc. (WEST). 2005c. Exhibit A: Ecological Baseline Study at the Elkhorn Wind Power Project. Draft final report prepared for Zilkha Renewable Energy, LLC, Portland, Oregon, by WEST, Cheyenne, Wyoming. June 2005.

Western EcoSystems Technology, Inc. (WEST). 2005d. Wildlife and Habitat Baseline Study for the Proposed Biglow Canyon Wind Power Project, Sherman County, Oregon. March 2004 - August 2005. Prepared for Orion Energy LLC., Oakland, California. WEST, Cheyenne, Wyoming. October, 2005.

Western EcoSystems Technology, Inc. (WEST). 2006. Diablo Winds Wildlife Monitoring Progress Report, March 2005 - February 2006. Technical report submitted to FPL Energy and Alameda County California. WEST. Cheyenne, Wyoming.

Western EcoSystems Technology, Inc. (WEST). 2007. Wildlife and Habitat Baseline Study for the Vantage Wind Power Project, Kittitas County, Washington. Draft report prepared for Invenergy by Western EcoSystems Technology, Inc. (WEST), Cheyenne Wyoming and Walla Walla, Washington. June 2007

Western EcoSystems Technology, Inc. (WEST). 2009. Wildlife Baseline Studies for the Antelope Ridge Wind Resource Area, Union County, Oregon. August 28, 2008 - August 12, 2009. Draft final report prepared for Horizon Wind Energy, Houston, Texas. Prepared by WEST, Cheyenne, Wyoming.

Western EcoSystems Technology, Inc. (WEST) and Colorado Plateau Research Station (CPRS). 2006. Avian Studies for the Proposed Sunshine Wind Park, Coconino County, Arizona. Prepared for Sunshine Arizona Wind Energy, LLC., Flagstaff, Arizona, by WEST, Cheyenne, Wyoming, and the CPRS, Northern Arizona University, Flagstaff, Arizona. May 2006.

Young, D.P. Jr., W.P. Erickson, K. Bay, J. Jeffrey, E.G. Lack, R.E. Good, and H.H. Sawyer. 2003a. Baseline Avian Studies for the Proposed Hopkins Ridge Wind Project, Columbia County, Washington. Final Report, March 2002 - March 2003. Prepared for RES North America, LLC., Portland, Oregon, by Western EcoSystems Technology, Inc.(WEST), Cheyenne, Wyoming. April 30, 2003.

Young, D.P. Jr., W.P. Erickson, K. Bay, J. Jeffrey, E.G. Lack, and H.H. Sawyer. 2003b. Baseline Avian Studies for the Proposed Desert Claim Wind Power Project, Kittitas County, Washington. Final Report. Prepared for Desert Claim Wind Power, LLC, Ellensburg, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. July 2003.

Young, D.P. Jr., W.P. Erickson, J. Jeffrey, K. Bay, R.E. Good, and E.G. Lack. 2003d. Avian and Sensitive Species Baseline Study Plan and Final Report. Eurus Combine Hills Turbine Ranch, Umatilla County, Oregon. Technical report prepared for Eurus Energy America Corporation, San Diego, California and Aeropower Services, Inc., Portland, Oregon, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. March 10, 2003.

Young, D.P. Jr., G.D. Johnson, V.K. Poulton, and K. Bay. 2007b. Ecological Baseline Studies for the

Young, D.P. Jr., V.K. Poulton, and K. Bay. 2007c. Ecological Baseline Studies Report. Proposed Dry Lake Wind Project, Navajo County, Arizona. Prepared for PPM Energy, Portland, Oregon, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. July 1, 2007.

Appendix A
California Condor Mitigation Strategy

CALIFORNIA CONDOR MITIGATION STRATEGY
CALIFORNIA HIGH WIND PROJECTS
TEHACHAPI WIND RESOURCE AREA



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October 2010

CONDOR MITIGATION STRATEGY
CALIFORNIA HIGH WIND PROJECTS
TEHACHAPI WIND RESOURCE AREA

Terra-Gen Power, LLC has proposed a comprehensive California Condor Mitigation Strategy for California High Wind Projects (CHWP) in the Tehachapi Wind Resource Area (TWRA). In order to effectively protect and manage the California condor within the TWRA, Terra-Gen proposes to create a Condor Preservation Foundation (hereafter, the Foundation). Companies proposing wind energy facilities in the TWRA would be required by Kern County to contribute to the Foundation. The advantages of establishing a foundation are that it can more effectively protect the California condor and implement the mitigation strategies outlined below than could be accomplished on a project-by-project basis. The Foundation, for example, can reach a wider audience for public outreach and education, focus its efforts on research and funding, employ condor biologists, operate a carcass management plan over an area that encompasses all future and potentially existing projects, and develop an effective and widespread condor supplemental feeding program. Eventually, the Foundation could purchase and manage condor conservation lands.

Below are brief discussions of some of the key components of an effective mitigation strategy for minimizing harm to California condors and aiding in the condor's recovery in the wild. The suggested mitigation strategies outlined below are grouped into six major categories, listed roughly in descending order of importance:

1. Elimination of lead bullet fragments and lead shot from the current and future range of the California condor in California;
2. Implementation of a carcass management and supplemental feeding program;
3. Support for the California condor recovery plan;
4. Funding for California condor research and education programs;
5. Hiring of a full-time biologist;
6. Implementation of a Common Raven Management Plan.

1. Elimination of Lead Bullet Fragments and Lead Shot From the Current and Future Range of the California Condor in California

Lead poisoning remains the number one killer of California condors, and the source of this lead has been traced to bullet fragments in carcasses and gut piles left by hunters. Lead poisoning is now thought to have been one of the major causes of mortality that resulted in the decline of the California condor in the latter half of the 20th Century, particularly since the development of lead ammunition that fragments upon impact in living tissue. All-copper bullets, on the other hand, are far less toxic to condors. They also do not fragment upon impact like lead bullets, and condors are less likely to ingest an intact bullet than many small bullet fragments scattered throughout a carcass or gut pile.

Many recently reintroduced condors have been exposed to high levels of lead. Since their release back into the wild beginning in the mid-1990s, at least two deaths in California and eight deaths in Arizona have been attributed directly to lead poisoning, while another three condors in California with high lead levels in their blood died during emergency chelation treatment. Several other birds would likely have died due to lead toxicity if it were not for chelation treatment. Other birds have disappeared with no known cause of death, with lead poisoning a plausible explanation. Lead poisoning is, thus, considered to be the most significant current cause of condor mortality.

Research on golden eagles within the range of the California condor has documented high lead levels in that species as well (Bloom 1989, Pattee et al. 1990). Golden eagles also feed on carrion and typically compete with condors for available carrion where their ranges overlap. Approximately 35.8% of the 162 golden eagles sampled had elevated lead levels, comparable to levels reported on free-ranging California condors. The blood lead levels were highest during the months of October, November, and December, which correlates with peak hunting season (Pattee et al 1990).

In spring 2007, the Tejon Ranch Company announced a total ban on the use of lead shot and bullets for hunting purposes on the Tejon Ranch. The State of California subsequently enacted the Ridley-Tree Condor Preservation Act (AB 821), which banned lead ammunition in the range of the California condor effective July 1, 2008. As a result of these initiatives, condor mortality rates resulting from lead poisoning are expected to decline in the future. But enforcement of the ban will be challenging, especially since lead shot and lead bullets can be purchased elsewhere in the state and is not illegal outside the condor's range.

- In furtherance of the ban on use of lead shot and lead bullets for hunting, the Foundation should support efforts to ban the sales and use of lead ammunition throughout Kern County in the short-term and elimination of lead shot and lead bullets used for hunting statewide in the long term.

Because lead toxicity has been identified as the leading cause of death in condors in the Arizona reintroduction program, the Arizona Game and Fish Department began encouraging sportsmen to take lead reduction actions when hunting in condor range (see www.azgfd.gov/w_c/california_condor_lead.shtml). In Fall 2005, as part of an effort to reduce lead exposure in condors, the Department offered non-lead rifle ammunition to big game hunters in the areas condors frequent most. Hunters responded, and 65% participated voluntarily in this program paid for by state lottery revenue. As a result, condor lead exposure rates declined by 40% from the previous year. Additionally, 93% of successful hunters who used the non-lead ammunition said it performed as well or better than lead bullets.

- In addition to supporting a ban on the use of lead ammunition, the Foundation should consider encouraging and funding a countywide effort to subsidize sales of non-lead bullets to sportsmen until such time that lead ammunition is banned statewide.

2. Implementation of a Carcass Management and Supplemental Feeding Plan

California condors are obligate scavengers, feeding only on the carcasses of dead animals, primarily medium- to large-sized mammals. Typical foraging behavior includes long-distance reconnaissance flights, lengthy circling flights over a carcass, and hours of waiting at a roost or on the ground near a carcass. Prior to the arrival of European man, California condor food items within interior California probably included mule deer (*Odocoileus hemionus*), tule elk (*Cervus elaphus nannodes*), pronghorn antelope (*Antilocapra americana*), and smaller mammals. Along the Pacific shore, their diet included whales, sea lions, and other marine species. With the introduction of livestock into California, the deliberate killing and control of large mammalian predators, and the demise of pronghorn and tule elk, the condor diet shifted dramatically. By the 20th Century, 95% of the California condor diet consisted of cattle, domestic sheep, ground squirrels (*Spermophilus beecheyi*), mule deer, and horses, with over half of the condors feeding on cattle carcasses, mostly calves. California condors appear to feed only 1 to 3 days per week, but the frequency of adult feeding is variable and may show seasonal differences. Condors feed on decaying as well as fresh carcasses and are not known to feed on roadkill.

Seasonal shifts seem to be based generally on food availability. For example, California condors tend to move to the Tehachapi Mountains area during the hunting season where deer gut-piles and abandoned deer carcasses are consumed; whereas, during the calving season in the San Joaquin Valley foraging region, wild California condors frequently feed on calf carcasses. Year-round pig hunting, however, on Tejon Ranch and perhaps areas within the TWRA provides the potential for abundant large carcasses in any season.

One of the primary objectives of the CHWP is to keep condors away from wind turbines. This can be accomplished in part by reducing the amount of food sources available to condors near wind turbine facilities.

- The Foundation should routinely inspect the TWRA and adjacent areas for any animal carcasses, and particularly those killed by hunters, that are potentially lead-contaminated and remove those found. These inspections can be greatly facilitated by the use of aircraft during routine patrol efforts supplemented by ground observations.

- Other steps the Foundation may want to consider to reduce the number of potentially lead-contaminated carcasses is:
  - the elimination or close management of hunting within the TWRA, and
  - reduction of livestock grazing within the TWRA.

- Another approach in discouraging condors from foraging on lead-contaminated carcasses would be an aggressive raven management plan along with monetary support of the USFWS and CDFG regional raven management efforts. The idea behind this program is the knowledge that condors traditionally follow ravens to carcasses, as well as the fact that ravens are occasional predators of condor eggs. The mitigation measures required by Kern

County for new projects within the TWRA require such an aggressive raven management program.

- Kern County also requires an aggressive micro-trash program that includes training of employees in the dangers and prevention of micro-trash and micro-trash cleaning programs.

A recent analysis of condors outfitted with GPS-transmitters supports the notion that movement patterns tend to be highly influenced by food availability. Data from these birds, as well as VHF equipped birds from the 1980s at feeding and trap sites also clearly show that condors concentrate at supplemental feeding sites such as the current one at the Bitter Creek National Wildlife Refuge. Based on the best available science and consultations with USFWS and other biological experts on the California condor, construction and operation of one or more feeding stations in collaboration with the USFWS as part of a supplemental feeding program will contribute to the conservation and recovery of the California condor. A supplemental feeding program should continue to reduce (but not eliminate) the likelihood of injury or mortality of California condors from lead or other poisoning by offering the birds a safe alternative to feeding on contaminated carcasses. In addition, feeding sites can be strategically located in order to influence movements of the birds away from wind turbine areas. Finally, supplemental feeding can permit the reintroduction and maintenance of California condor populations in areas where the supply of natural food resources is too variable to support the birds over the entire annual cycle. The supplemental feeding program will predictably become even more important in two more decades when the number of wild southern California condors should more than double. Such sites may also provide the opportunity for public viewing of condors, from an appropriate distance.

- In collaboration with the USFWS, the Foundation should implement an off-site supplemental feeding program to provide an ongoing source of clean, lead-free and contaminant-free food for California condors to keep them from using the TWRA as a foraging habitat..

- With approval from USFWS, clean carcasses should be supplied at designated spots well removed from wind turbine locations to encourage condors away from both the wind turbine rows and potentially contaminated carcasses elsewhere within the TWRA.

- Food carcasses should generally be stillborn calves supplied by a local dairy or ranch, or dead cattle or other large animals (e.g., deer, pigs) that have been determined to be free of lead and other contaminants. The feeding site(s) will be supplied at least twice per week or as needed.

- The program will be implemented by a qualified biologist retained by the Foundation (see below). The biologist will be trained by USFWS personnel in feeding station protocols prior to the biologist being able to supply the designated feeding site with carcasses.

- An MOU issued by the USFWS will serve as the official endorsement and certification by the USFWS of the Foundation as a qualified operator in the supplemental feeding of

California condors. The supplemental feeding program will be initiated upon approval of the MOU by the USFWS.

3. Support for the California Condor Recovery Plan

While discouraging condor use of the TWRA, the Foundation should encourage the expansion of the overall numbers of condors in the wild by supporting the California condor recovery efforts. To this end, the Foundation should commit to certain measures that are collaborative in nature and intended to contribute to the conservation and recovery of the California condor in the wild. These measures are discussed below.

- The Foundation should be fully supportive of recovery efforts and efforts to increase the scientific database that supports the recovery effort.
- The Foundation can assist in funding the production of condors in captivity and the release sites where they are re-introduced into the wild.
- The Foundation should consider creating pit trap and cannon net sites at supplemental feeding locations that provide the USFWS the flexibility to trap condors that are sick or injured and treat them in a controlled situation such that they can be eventually released back into the wild, or to monitor blood lead and other chemical levels.

4. Funding for California Condor Research and Education Programs

Southern California zoos and university-level research programs have already greatly aided efforts to successfully rear condors in captivity and reintroduce them into the wild and to gain a better understanding of the causal factors that resulted in the necessity for a captive breeding program in the first place. Without such work, the captive breeding and recovery programs would have been much less likely to succeed. Ongoing research is critical to the continuing success of these programs. A number of vital research programs are in need of funding and/or manpower in order to continue uninterrupted and others are in need of funding to be initiated. The Foundation can assist with these programs in several ways.

- The Foundation may choose to provide funding to the USFWS to institute a GPS satellite-tracking transmitter or similarly effective system to allow for the continuous, real-time monitoring of the location of California condors. In furtherance of this effort, the Foundation should consider providing an initial fee of approximately $150,000 prior to the issuance of any development permits affecting suitable condor foraging or roosting habitat and an additional $20,000 every year afterwards for the life of the project. This system will enable the immediate location of birds that are not moving relative to the ground, which usually indicates than an injury, illness or death has occurred. The prompt retrieval of injured or sick birds will allow for the rapid implementation of appropriate medical care or rehabilitation, actions that have saved the lives of several condors in the past.

- The Foundation can initiate, support, and fund university level research efforts that address important issues such as the following:

- Golden eagles and red-tailed hawks are impacted by wind farms. In sublethal amounts, lead may be a contributing factor in causing collisions by interfering with their cognitive recognition of wind turbines or accurately judging their trajectory.
- Study the potential attractants of condor into the TWRA, and conceive additional mitigation efforts to keep them from expanding their range into the wind resource areas of the TWRA.
- Hire or support a biostatistician to work with condors on the TWRA and beyond.

5. Hiring of a Full-Time Biologist

It is recommended that the Foundation retain the services of a full-time biologist to be responsible for implementing the supplemental feeding program and generally managing condor use of the TWRA as described in this and previous sections. The hiring should occur no later than 30 days prior to initiation of the start of wind resource facility construction. The biologist's primary function will be to assist the Foundation in minimizing and mitigating any unfavorable interactions between humans and California condors and in administering the avoidance, minimization, and mitigations pertaining to condors outlined in this document. Other duties and responsibilities of the biologist include but are not limited to the following:

- To facilitate the recovery and long-term survival of individual California condors on TWRA, the biologist will monitor for condors currently wearing only VHF transmitters and will analyze near real-time downloads of GPS locations of California condors using the TWRA and notify the USFWS of any atypical behavior so that the agency can respond quickly.

- Because California condors and other scavengers are so vulnerable to contaminants of all kinds, lead, micro-trash and other contaminant studies will likely be needed for the foreseeable future. The biologist will be an active collaborator in any effort that promotes condor conservation on the TWRA. This may include collecting tissue samples from dead animals, or the collection of whole carcasses, blood samples from live eagles, ravens and vultures, or the use of a radiograph.

- Working in collaboration with USFWS condor biologists, the biologist will assist when needed with the placement of lead-free dairy calf carcasses or similar dead animals at supplemental feeding stations.

- The biologist shall actively search for small collections of micro-trash, and larger collections at historic or recent garbage sites, and either remove them immediately if the sources are small or develop plans for their later removal, perhaps with local community effort.

- If requested or desired by the USFWS, the biologist may also participate in condor capture events that occur on the TWRA, if any.

- The biologist will coordinate with retained environmental education specialists, as described above, to prepare guidelines and educational programs regarding micro-trash and proper behavior by persons who recreate or hunt in the TWRA.

- The biologist will monitor use of the TWRA by condors and facilitate communication and coordination among the USFWS and the Foundation to ensure that allowed uses of the TWRA do not compromise the value of the area as a California condor safe zone.

- The biologist will prepare annual monitoring and compliance reports regarding compliance and enforcement of measures associated with avoiding and/or mitigating potential impacts on condors as described herein.

As more projects come on-line, additional biologists can be hired as needed.

6. Implementation of a Raven Management Plan

A Common Raven Management Plan will be developed for the project site in consultation with the USFWS and the CDFG. This plan will contain measures such as annual nest removal, removal of carrion at the base of turbines, storage of garbage in raven-proof containers, and the installation of anti-nesting devices on structures where raven nests could be built.

The CHWP has contributed to and will continue to contribute to the USFWS regional raven management program to fund the following raven management measures:

- reduction of food, water, sheltering, and nesting sites;
- common raven nest removal;
- common raven removal;
- evaluation of effectiveness and adaptive management; and
- education and outreach
- banding, blood sampling for lead, and/or radio-telemetry research.

References

American Wind Energy Association. 1995. *Avian Interactions With Wind Energy Facilities: A Summary*. Prepared by Colson and Associates for AWEA, Washington. DC.

Anderson, R. L., Tom, J., Neumann, N., Cleckler, J., and Brownell, J. A. 1995. *Avian monitoring and risk assessment at Tehachapi Pass Wind Resource Area, California, 1995*. Progress report to the California Energy Commission, CEC-700-95-001.

Barrios, L., and Rodríguez, A. 2004. Behavioural and environmental correlates of soaring-bird mortality at on-shore wind turbines. J. Applied Ecology 41: 72-81.

Bloom, P.H., J.N. Scott, O.H. Pattee, and M.R. Smith. 1989. Lead contamination of Golden Eagles within the range of the California Condor. In Raptors in the Modern World – Proceeding of the International Conference of Birds of Prey. Eilat, Israel, 1987.

Estep, J. 1989. Avian mortality at large wind energy facilities in California: identification of a problem. Staff report no. P700-89-001. California Energy Commission, Sacramento, CA. Haussler, R. 1988. Avian mortality at wind turbine facilities in California. Paper presented at 1988 American Wind Energy Association National Conference, Honolulu, HI.

de Lucas, M., Janss, G. F. E., Whitfield, D. P., and Ferrer, M. 2008. Collision fatality of raptors in wind farms does not depend on raptor abundance. *J. Applied Ecology* 45: 1695-1703.

Leukonia, J. M. 2001. Uso del espacio por la avifauna y control de a mortalidad de aves en los parques eólicos de Navarra. Govierno de Navarro, Pamplona.

Lekuona, J. M., and Ursua, C. 2007. Avian mortality in wind power plants of Navarra (northern Spain). In: de Lucas, M, Janns, G. F. E., and Ferrer, M. (eds.), *Birds and Wind Farms: Risk Assessment and Mitigation*, Quercus.

Orloff, S., and Flannery, A. 1992. Wind turbine effects on avian activity, habitat, and mortality in Altamont Pass and Solano County Wind Resource Areas, 1989-1991. Final Report to Alameda, Contra Costa, and Solano Counties and California Energy Commission by Biosystems Analysis, Inc., Tiburon, CA.

Orloff, S., and Flannery, A. 1996. A continued examination of avian mortality in the Altamont Pass Wind Resource Area. Prepared by BioSystems Analysis Inc., Tiburon, CA, for the California Energy Commission, Sacramento, CA.

Pattee, O.H., P.H. Bloom, J.M. Scott, and M.R. Smith. 1990. Lead Hazards Within the Range of the California Condor. Condor 92:931-937.

Smallwood, K. S., and Thelander, C. G. 2004. Developing Methods to Reduce Bird Mortality in the Altamont Pass Wind Resource Area. Final Report by BioResource Consultants to the California Energy Commission, Public Interest Energy Research-Environmental Area, Contract No. 500-01-019:L Spiegel, Program Manager.
appendices.

Sterner, D., Orloff, S., and Spiegel, L. 2007. Wind Turbine Collision Research in the United States. In: de Lucas, M, Janns, G. F. E., and Ferrer, M. (eds.), *Birds and Wind Farms: Risk Assessment and Mitigation*, Qurecus.

Thelander, C. G., and Rugge, L. 2001. Examining relationships between bird risk behaviors and fatalities at the Altamont Wind Resource Area: a second year's progress report. In: Schwartz, S. S. (ed.), *Proceedings of the National Avian-Wind Power Planning Meeting IV, Carmel, CA. May 16-17, 2000*, pp. 5-14. Prepared for the Avian Subcommittee of the National Wind Coordinating Committee by RESOLVE, Inc., Washington DC.

Thelander, C. G., Smallwood, S., and Rugge, L. 2001. Bird risk behaviors and fatalities at the Altamont Wind Resource Area – a progress report. Proceedings of the American Wind Energy Association, Washington, DC.

Thelander, C. G., and Smallwood, K. S. 2007. The Altamont Pass Wind Resource Area'seffects on birds: a case history. In: de Lucas, M, Janns, G. F. E., and Ferrer, M. (eds.), *Birds and Wind Farms: Risk Assessment and Mitigation*, Qurecus.

Appendix D-30

Draft #2 Eagle Conservation Plan
March 2012

Appendix D-30

Draft 42 Eagle Conservation Plan
March 2012

Draft No. 2

Conservation Plan for the Avoidance and Minimization of Potential Impacts to Golden Eagles

Alta East Wind Project

Submitted to

Bureau of Land Management

U.S. Fish and Wildlife Service

Submitted by

Alta Windpower Development, LLC

March 2012

Prepared by



CH2MHILL

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4 Golden Eagle Flightpaths from May 11, 2009 to May 6, 2010
5 Golden Eagle Flightpaths from July 10, 2010 to June 1, 2011
6 Golden Eagle Nesting Territory Survey Results, April 13, 2010 and May 24, 2010
7 Golden Eagle Nesting Territory Survey Results, February and April, 2011

Acronyms and Abbreviations

ACP	advanced conservation practice
AOCM	Alta Oak Creek Mojave
APLIC	Avian Power Line Interaction Committee
APP	avian protection plan
AWD	Alta Windpower Development, LLC
BGEPA	Bald and Golden Eagle Protection Act
BLM	U.S. Bureau of Land Management
BMP	best management practices
CEC	California Energy Commission
CFR	Code of Federal Regulations
ECP	Eagle Conservation Plan
IM	BLM Instructional Memorandum 2010-156
MW	megawatt(s)
NEPA	National Environmental Policy Act
ROW	right-of-way
SR	State Route
USFWS	U.S. Fish and Wildlife Service
WTG	wind turbine generator

SECTION 1.0

Introduction

Alta Windpower Development, LLC (AWD) proposes to construct the Alta East Wind Project (project) in the Tehachapi region of southern California. Portions of the project would be located on land managed by the U.S. Bureau of Land Management (BLM) and privately owned land under the jurisdiction of Kern County.

1.1 Project Description

The project is proposed to be located on approximately 3,195 acres on the northern and southern sides of State Route (SR) 58 in southeastern Kern County, California, within and adjacent to an area of existing wind development. The project area is approximately 3 miles northwest of the town of Mojave and approximately 11 miles east of the city of Tehachapi.

The proposed development is a wind energy facility with a nameplate capacity rating of approximately 300 megawatts (MW) of wind turbine generation and includes ancillary facilities and supporting infrastructure. Up to 120 wind turbine generators (WTG) would be installed. The project site includes private and federal lands. Federal lands within the project area are under BLM jurisdiction, and private lands are under the jurisdiction of Kern County. Approximately 30 percent of the project's area (1,115 acres) and approximately 33 percent of the WTGs would be located on land managed by Kern County. The location of the project site is shown on Figure 1, Project Area Map.

1.2 Background

BLM is the lead agency for review under the National Environmental Policy Act (NEPA). The U.S. Fish and Wildlife Service (USFWS) is a participating agency as it relates to their involvement in Section 7 consultation under the federal Endangered Species Act and the BLM Instructional Memorandum (IM) 2010-156 (hereafter referred to as the IM) issued in July 2010. The purpose of the IM is to provide direction for complying with the Bald and Golden Eagle Protection Act (BGEPA), including its implementing regulations for golden eagles (i.e., September 11, 2009, Eagle Rule 50, Code of Federal Regulations (CFR) parts 13 and 22), and to identify steps that may be necessary within the habitat of golden eagles to ensure environmentally responsible authorization and development of renewable energy resources. The IM is applicable until USFWS establishes criteria for programmatic golden eagle permits.

1.3 Purpose of the Conservation Plan

The project may have the potential to affect golden eagles or their habitat. Therefore conservation measures in the form of an Eagle Conservation Plan (ECP) have been prepared to avoid and minimize project impacts on golden eagles. This ECP for the avoidance and minimization of potential impacts on golden eagles has been developed by AWD to meet

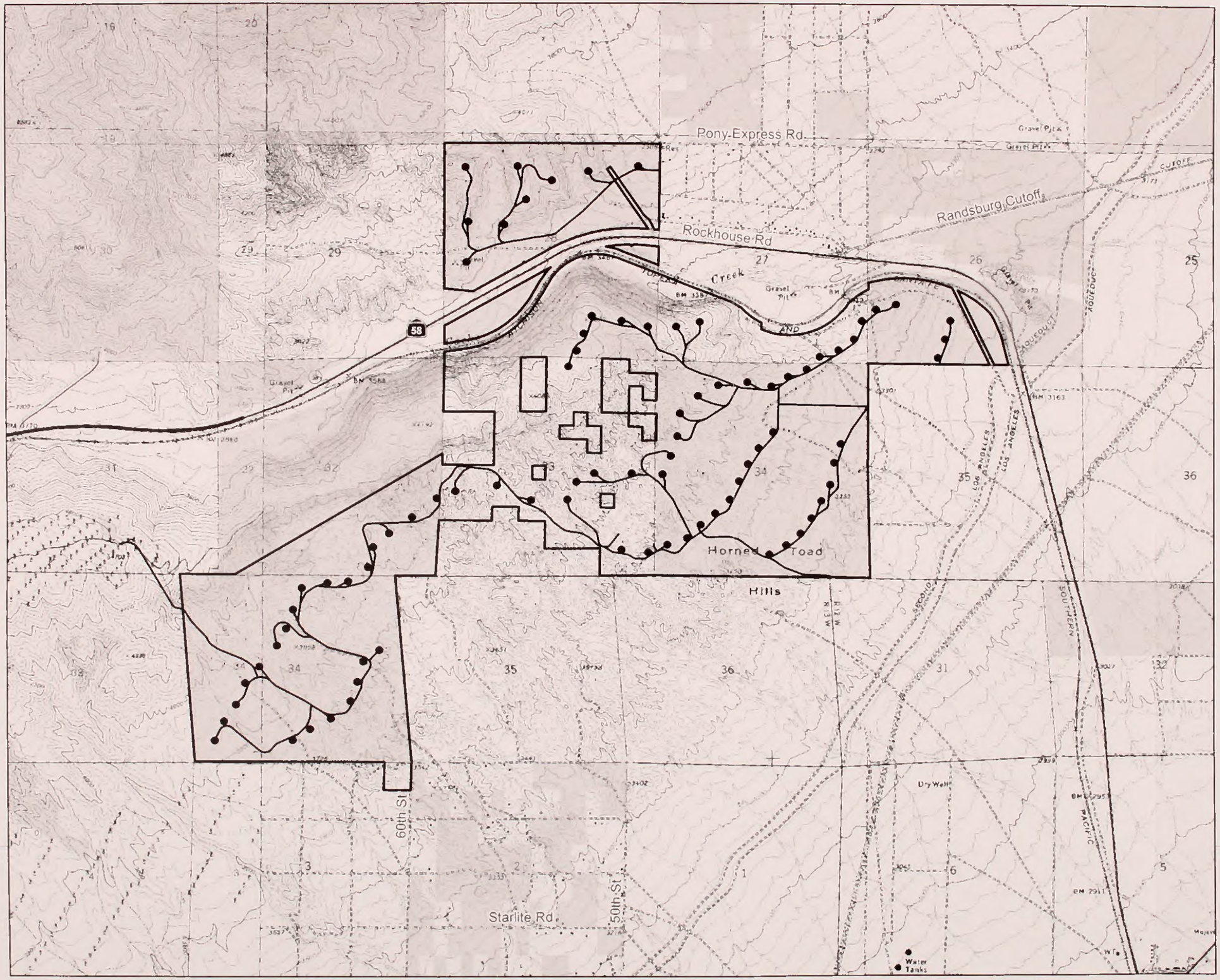
the requirement for an Avian Protection Plan (APP) according to the IM, and more recently detailed in the *Draft Eagle Conservation Plan Guidance* (USFWS, 2011). The ECP has been developed in coordination with USFWS and BLM, to evaluate options to avoid and minimize project impacts and address siting, operations, and monitoring. In accordance with the IM, a letter of concurrence from USFWS that addresses the adequacy of the plan is provided in Appendix A of this report (to be provided when received).

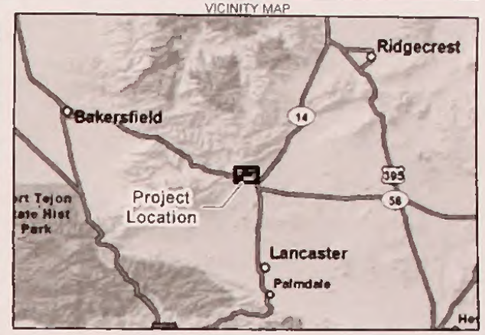
Additionally, this ECP has been developed to meet BLM and USFWS requirements for addressing the BGEPA. The BGEPA prohibits take of eagles, which is defined as any action to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, disturb, or otherwise harm eagles, their nests, or their eggs. The BGEPA defines "disturb" as to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle; (2) decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. The USFWS set in place rules establishing two new permit types: (1) incidental take of bald and golden eagles, which is associated with an activity but not the purpose of the activity; and 2) purposeful take of eagle nests that pose a threat to human or eagle safety (September 11, 2009; Federal Register, 50 CFR 13 and 22).

1.4 Interagency Coordination and Communication History

April 29, 2010	AWD provided USFWS with the biological resources study plan for review and input.
November 29, 2010	Representatives from AWD met with Ashleigh Blackford and Danielle Dillard of USFWS and Justin Sloan of the California Department of Fish and Game. Jacqui Kitchen of the Kern County Planning Department participated via telephone. The project was introduced and the results of baseline wildlife studies completed to date were presented.
November 30, 2010	AWD received correspondence from USFWS regarding the baseline study plan presented to USFWS in April 2010.
December 10, 2010	AWD responded to correspondence from USFWS regarding the baseline study plan
March 22, 2011	Draft ECP was submitted to USFWS.
September 26, 2011	Comments on Draft ECP received from the USFWS.
March 8, 2012:	Revised Document provided to USFWS for final review.

Future agency coordination and communication will be documented.





LEGEND

- Proposed Wind Turbine Layout
- Proposed Access Road
- BLM Lands
- Alta East Wind Project Area

N

0 1,100 2,200
Feet

FIGURE 1
Project Area Map
Alta East Wind Project
Alta Wind Energy Center Project

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SECTION 2.0

Eagle Conservation Plan Development

2.1 Stage 1 – Initial Site Assessment

In July 2009, AWD completed an initial site assessment to evaluate potential constraints or risks related to the project and its impacts to golden eagles. The Tehachapi area was specifically selected for evaluation because of the extensive existing wind energy development in the region, the expected low level of avian impacts associated with the operating projects, the lack of critical habitat for federally endangered species, and the apparently manageable issues related to other special-status species potentially present on site. Based on pre-field review of publicly available resources (California Natural Diversity Database [CDFG, 2009], California Native Plant Society database [2009], BLM special-status species management manual [BLM, 2001], and the California Desert Conservation Area Plan [BLM, 1999]), as well as reconnaissance surveys conducted at the site between 2006 and 2009 and during a March 19, 2009, site visit specifically designed to evaluate potential resource issues, it was determined that the site presented low levels of risk for biological resource issues, including eagles, and that investment in site-specific resource studies was warranted to evaluate the extent of golden eagle use and potential impacts to the species. Application of the procedural questions for ranking the project's risk level reveals that this project site possesses few risk factors and would pose minimal risk to eagles and is therefore a candidate for being a Category 3 site, based on the fact that the area was determined not likely to support important eagle-use areas.

2.2 Stage 2 – Site-specific Surveys and Assessment

In accordance with the IM, and consistent with the Stage 2 recommendations for site-specific surveys and assessment presented in the draft ECP guidance, AWD has considered golden eagles and their habitat in its baseline characterization studies of the project area. AWD applied the *Interim Golden Eagle Inventory and Monitoring Protocols and other Recommendations* (Pagel et al., 2010) and additional onsite studies of eagle use, completed in accordance with *The California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development* (California Energy Commission [CEC], 2007), to evaluate eagle use on the project. Additionally, AWD submitted its baseline study plan to USFWS for review and input in April 2010, and comments were received November 30, 2010.

Baseline eagle studies completed to date for the project include 30-minute point counts conducted at approximately 1-week intervals throughout the area proposed for development, from May 2009 through February 2011. In addition, helicopter surveys were completed in April and May 2010, and February 2011, to identify potential eagle nesting territories within 10 miles of the project area. The analysis area was determined in accordance with the USFWS Interim Inventory and Monitoring Protocols available for golden eagles. Onsite surveys to document the extent of eagle use are planned to continue at least through May 2011, and additional helicopter surveys will be completed in spring 2011

to monitor previously identified nesting territories and identify new or previously undiscovered territories, if present. Future eagle surveys will be completed in accordance with USFWS 2010 Inventory and Monitoring Protocol recommendations (Pagel et al., 2010) as requested by USFWS in the November 29, 2010 meeting. Site-specific survey methods and results are summarized below, and complete avian reports that include detailed discussion of methods and results are presented in Chatfield et al. (2010a, b, and c).

2.2.1 Avian Point Count Surveys

The objective of the fixed-point bird use surveys was to estimate the seasonal and spatial use of the study area by birds, particularly diurnal raptors, which include golden eagles. Fixed-point surveys (variable circular plots) were conducted using methods described by Reynolds et al. (1980). All birds, with a focus on raptors and large birds, seen during each 30-minute fixed-point survey were recorded. These surveys are standard assessment techniques used to assess most wind energy projects in California and are completed in accordance with CEC guidelines (CEC, 2007).

Six points were selected to survey representative habitats and topography, while providing relatively even coverage of the area that was proposed for development in May 2009 (Figure 2). For the purposes of golden eagle assessment, a viewshed of 800 meters around each point was assessed. If eagles were observed, flight paths were mapped across the survey point. The project boundary was modified to include additional area in June 2010, so the locations of three of the six avian use survey points were modified to more specifically assess the area anticipated for project development (Figure 3). Avian survey point 4 was moved approximately 0.5 miles south to allow the assessment viewshed to encompass the entire parcel located north of Highway 58. Points 5 and 6 were moved south of the highway, Point 5 approximately 0.5 mile south and Point 6 approximately 2 miles southeast, to enable full assessment of eagle use along the ridge located south of Highway 58 and of the southwestern portion of the new project area. These points were evaluated for one year during the second year of the study. The effect of relocating these avian survey points preclude direct comparison of mean use from year 1 to year 2 for these three points; however, the relocation substantially enhances the ability to understand eagle use of the area planned for WTG installation, and thus enables more comprehensive assessment of the potential risk that the project, as proposed, would pose to golden eagles using the project area.

A total of 311 30-minute fixed-point bird use surveys were conducted during 52 site visits, from May 2009 through May 2010. A total of 7 golden eagle groups with 11 individual sightings were recorded during this sampling effort. However, all observations occurred off the project area at survey points 4, 5, and 6 Figure 4). Observations were recorded during all seasons (spring, n=1 eagle; summer, n= 1; fall, n= 3; winter, n= 6) and suggested potentially higher use of these off site areas in winter (Table 1). Except in the case of one fall sighting of two separate birds and three winter sightings of two separate birds, it cannot be determined from the data collected if these are repeat sightings of the same birds or individual sightings of unique birds.

The eagle use documented in the May 2009 to May 2010 studies is potentially explained by the existence of eagle nesting territories north and west of the project as described in Section 2.2.2, Nesting Territory Surveys. During the survey period, all eagle use was off the

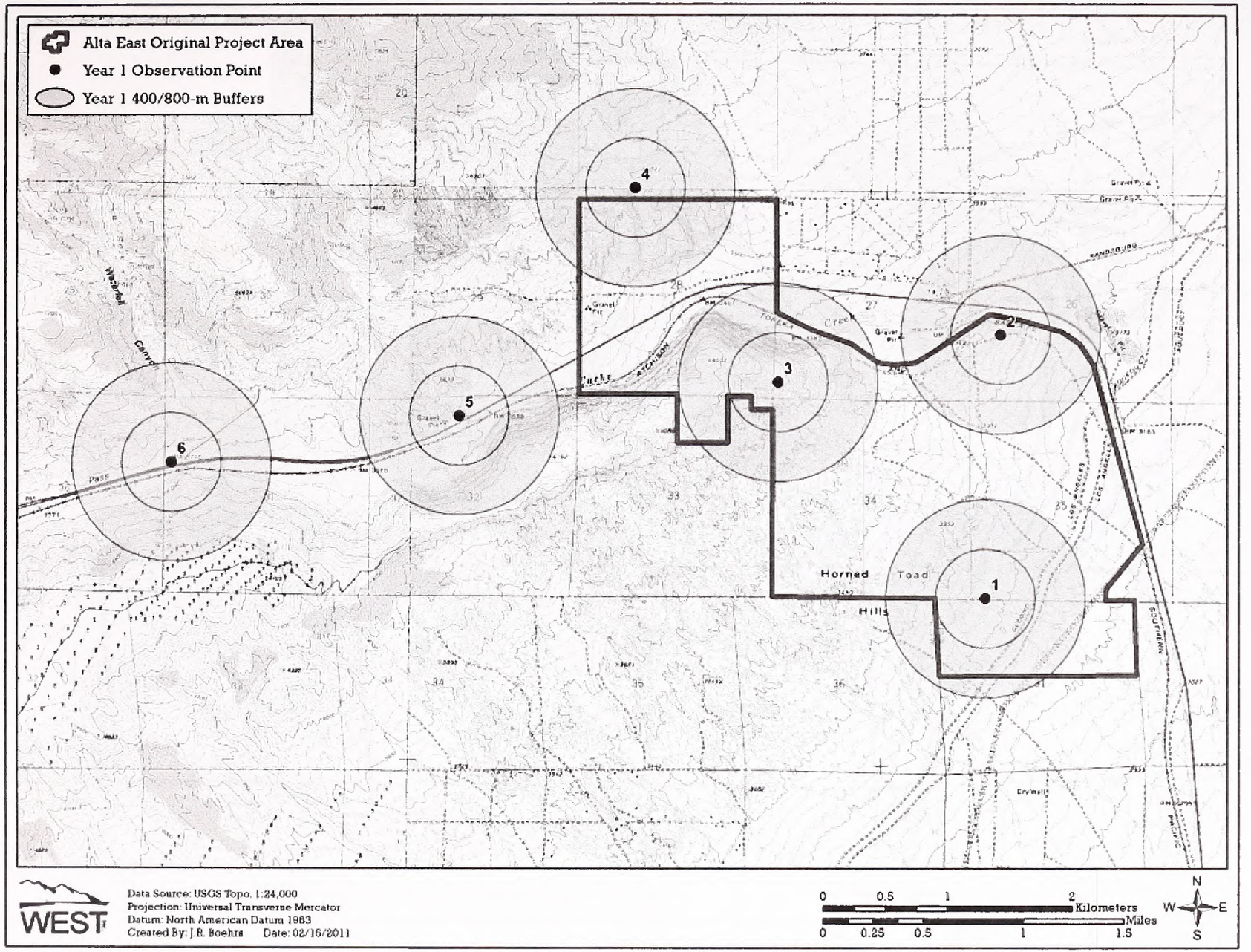


FIGURE 2
Alta East Project Boundary and Avian Use Survey Points from May 11, 2009 to May 6, 2010

Alta East Wind Project
Alta Wind Energy Center Project

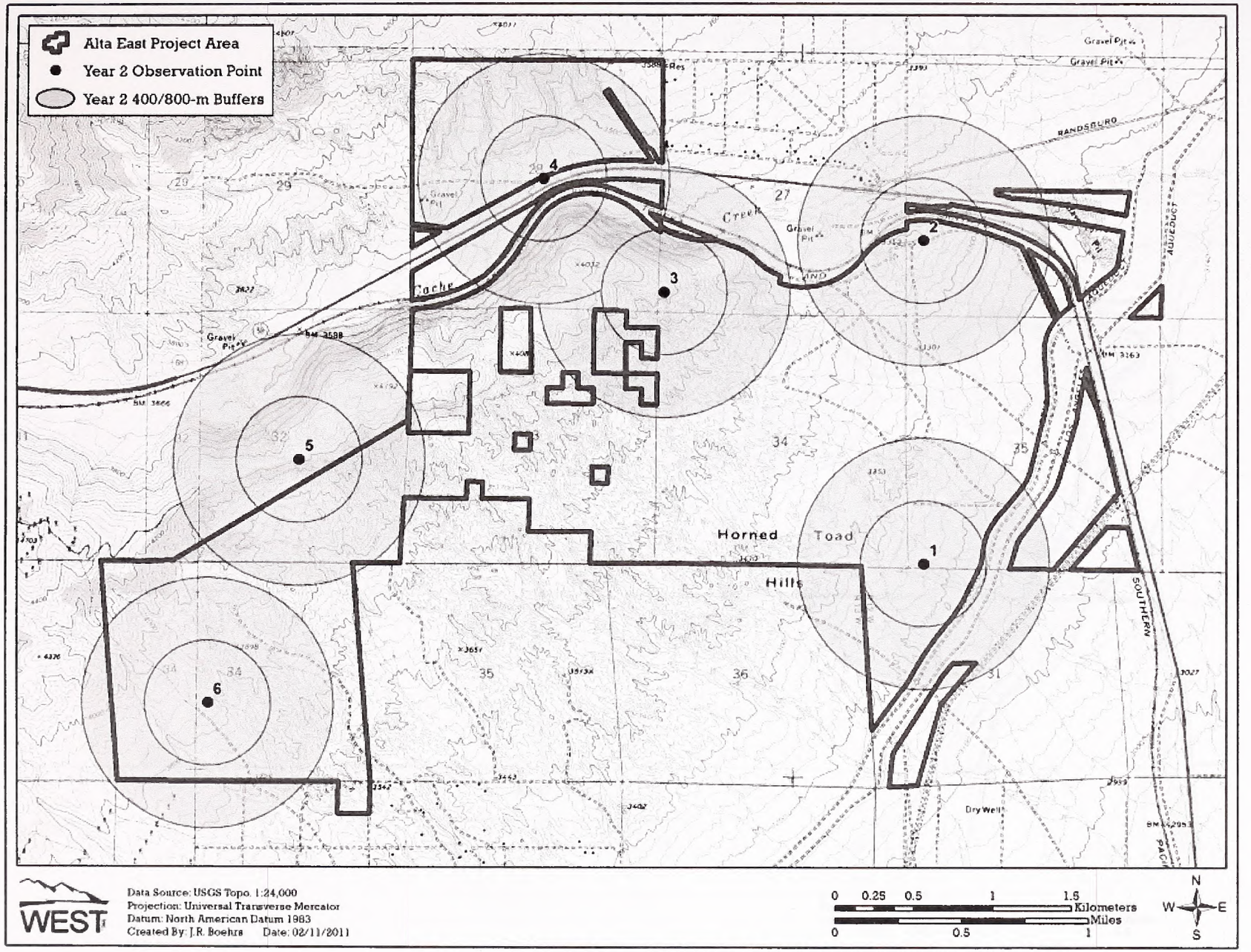


FIGURE 3
Alta East Project Boundary and Avian Use Survey Points from July 10, 2010 to June 1, 2011
Alta East Wind Project
Alta Wind Energy Center Project

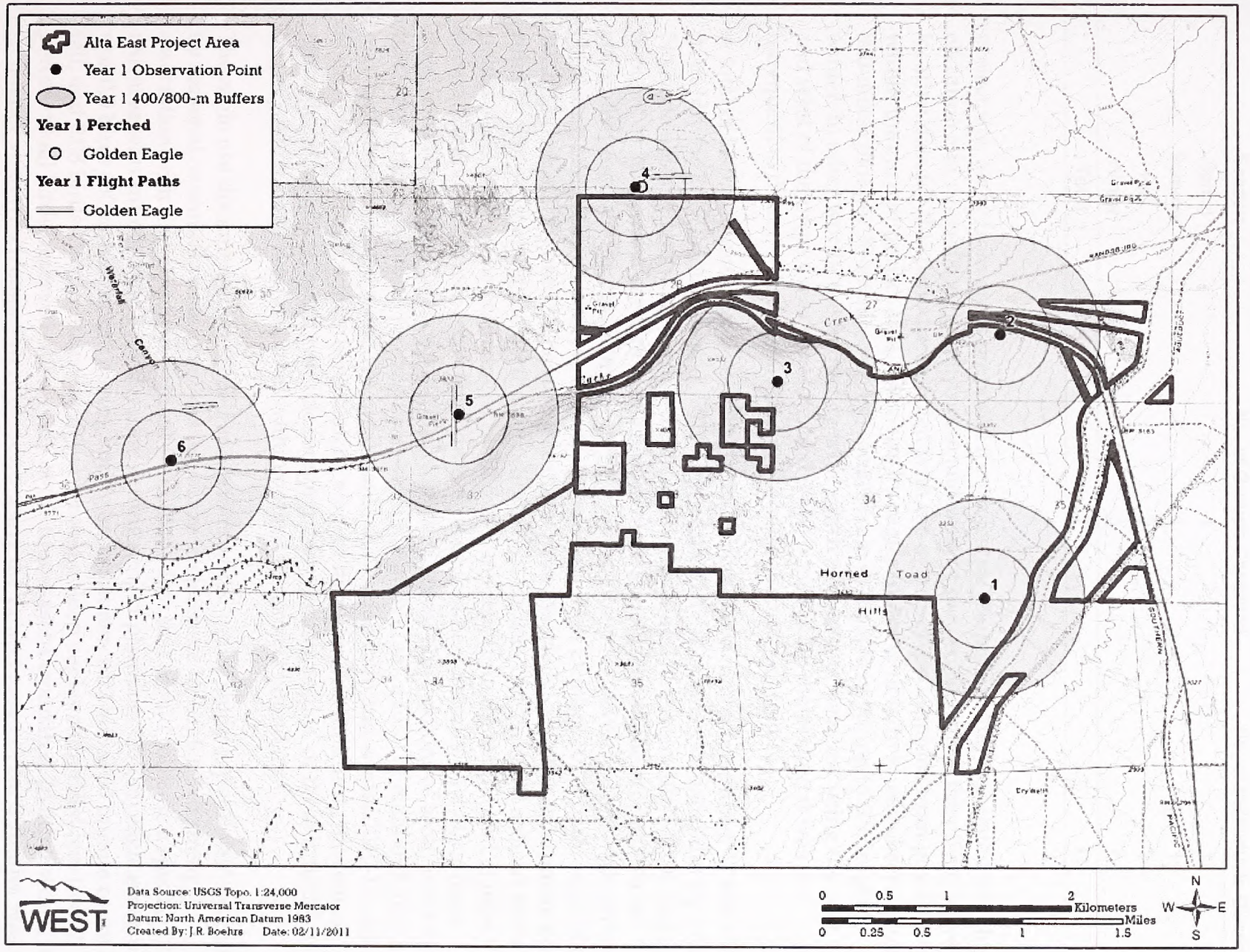


FIGURE 4
Golden Eagle Flightpaths from May 11, 2009 to May 6, 2010
Alta East Wind Project
Alta Wind Energy Center Project

TABLE 1
Golden Eagle Group and Individual Observations, May 11, 2009 to May 6, 2010
Alta East Wind Project

Season	No. of Groups Observed	No. of Individuals Observed
Spring	1	1
Summer	1	1
Fall	2	3
Winter	3	6
Total	**7**	**11**

project site, away from areas proposed for project development, and associated with higher elevation and rugged topography north and west of the project. When the offsite survey location data for this period are pooled with the avian survey locations from points located within the current project area, mean use by eagles (number of individuals observed per 800-meter plot per 30-minute survey) ranges from 0.01 eagle in spring to 0.07 eagle in winter. In other words, the frequency with which eagles were detected using the area north and west of the project was very low, and if use occurred on the project, it was too infrequent to detect with the standard probabilistic sampling regime.

A total of 260 30-minute fixed-point bird use surveys were conducted during 47 site visits, from July 10, 2010 through June 1, 2011 at the six avian use points evaluated during year 2. No eagle observations were recorded during studies conducted from July 10, 2010 through September 2010, when surveys were focused more specifically on the project area as currently proposed for development (see Figure 3). However, seven golden eagle groups consisting of eight eagle observations were recorded from October 10, 2010 through March 10, 2011 (Table 2: Figure 5). These observations were associated with the escarpment edge running east-west along the northern portion of the project, concentrated around survey points 3 and 4, with one occurring at point 5. It is evident from these data that at least three separate individuals were recorded; however, it cannot be determined whether these detections were of unique nomadic individuals or repeat observations of local/resident birds. Assuming each bird recorded was a unique individual, a total of eight different eagles may have been detected using the project area during fall 2010 and winter 2010-11. All eight of these fall and winter observations were of flying eagles, indicating movement through the project area and possible foraging. No perching eagles, or those actually feeding on prey items, have been recorded within or near the project boundary.

The eagle use documented in the fall and winter of the year 2 study is potentially explained by seasonal or annual variation in the use of the project area by eagles. No strong association with topography is evident from these data that would indicate a specific high risk area warranting siting consideration during project planning. Golden eagle mean use was 0.0 birds/30 minute count during spring and summer, 0.02 birds/30 minute count in fall, and 0.08 birds/30 minute count in winter and golden eagles comprised less than 2 percent of all birds observed during any of the four seasons evaluated. In other words, the frequency with which eagles were detected using the project area in year 2 studies was very low.

TABLE 2
Eagle Observations from October 7, 2010 through June 1, 2011
Alta East Wind Project

Date	Point	Age	# Individuals	Height Above Ground (meters)		Activity
				Highest	Lowest	
10/7/2010	3	Adult	1	400	200	Soaring
11/30/2010	3	Juvenile	1	110	40	Gliding
12/7/2010	1	Unknown	1	45	25	Gliding
1/20/2011	3	Adult	1	85	20	Soaring
2/17/2011	4	Juvenile	2	125	40	Circle Soaring
2/25/2011	3	Unknown	1	40	40	Gliding
2/25/2011	6	Unknown	1	40	25	Gliding

2.2.2 Nesting Territory Surveys

Aerial eagle nest surveys were conducted via helicopter on April 13 and May 24, 2010 at the project area and again in February and April, 2011. The objective of the surveys was to locate nests that may be subject to disturbance or displacement effects from project construction or operation. While active and inactive nests of all raptor species were recorded, the survey specifically targeted golden eagles and was consistent with the USFWS Guidelines (Pagel et al., 2010). The survey area for golden eagle nests included all eagle nesting habitat within a 10-mile radius of the project.

No active eagle nests were located within the project boundary in 2010 (Figure 6). One active golden eagle nest was observed on a cliff ledge approximately 3.1 miles from the northwestern boundary of the project area. Two nestlings were observed in this nest on May 24, 2010. A second active golden eagle nest was observed in a live gray pine (*Pinus sabineana*) approximately 11.0 miles west of the project. One adult was observed on this nest on April 13, 2010, and two adults were observed perched in the nest vicinity on May 24, 2010. Single adult golden eagles were observed perched at two additional locations within the survey area, approximately 7.0 miles northeast and approximately 7.5 miles south of the project area. Additionally, nine inactive nests that could have potentially been constructed by golden eagles were documented within the survey area.

No active eagle nests were located within the project boundary in 2011. One aerial eagle nest survey was conducted in late February 2011 for area within 10 miles of the project. The nests identified in the 2010 surveys were present; however, no eagles were observed and the nests were determined inactive at this time. Eight additional inactive nests of varying condition were documented in the 2011 survey that may have been initially constructed or historically utilized by golden eagles. A second survey was completed in April 2011 and three active golden eagle nests were identified within 10 miles of the project (Figure 7). These nests were 3.0 miles northwest, 3.8 miles north, and 6.8 miles north of the project. The northwestern nest was confirmed o have failed and the two northernmost nests were confirmed active on

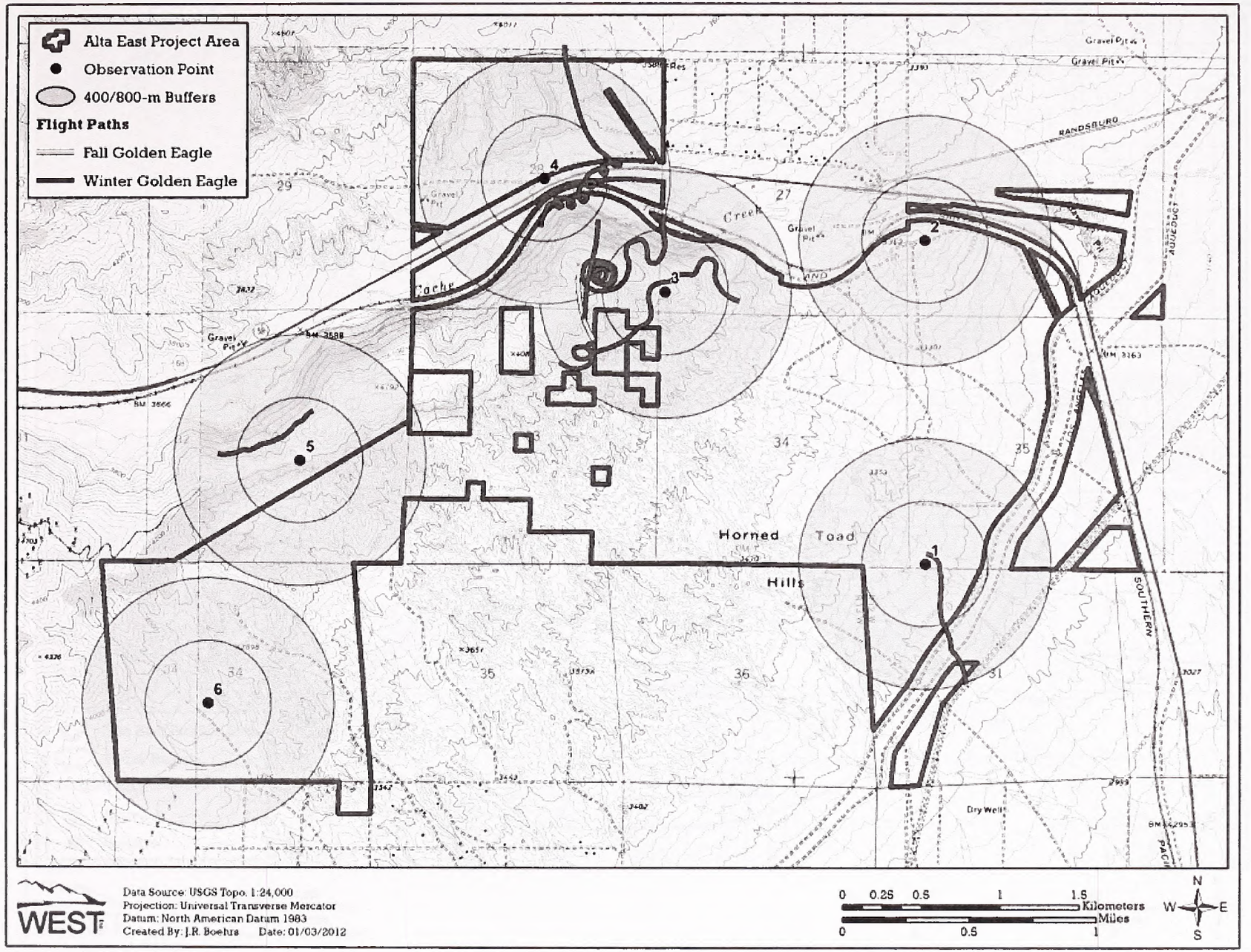


FIGURE 5
Golden Eagle Flightpaths from July 10, 2010 to June 1, 2011
Alta East Wind Project
Alta Wind Energy Center Project

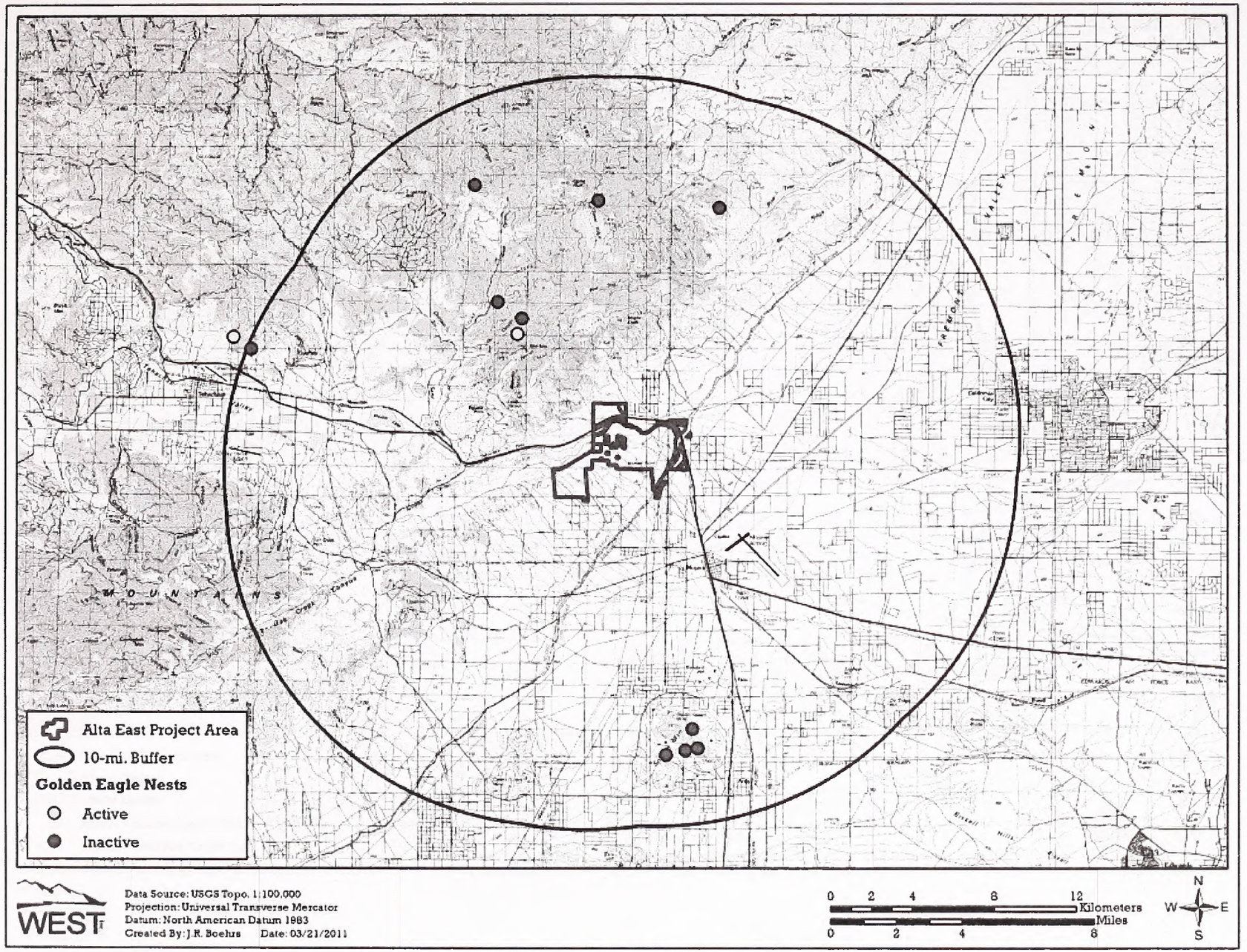


FIGURE 6
Golden Eagle Nesting Territory Survey Results, April 13, 2010 and May 24, 2010
Alta East Wind Project
Alta Wind Energy Center Project

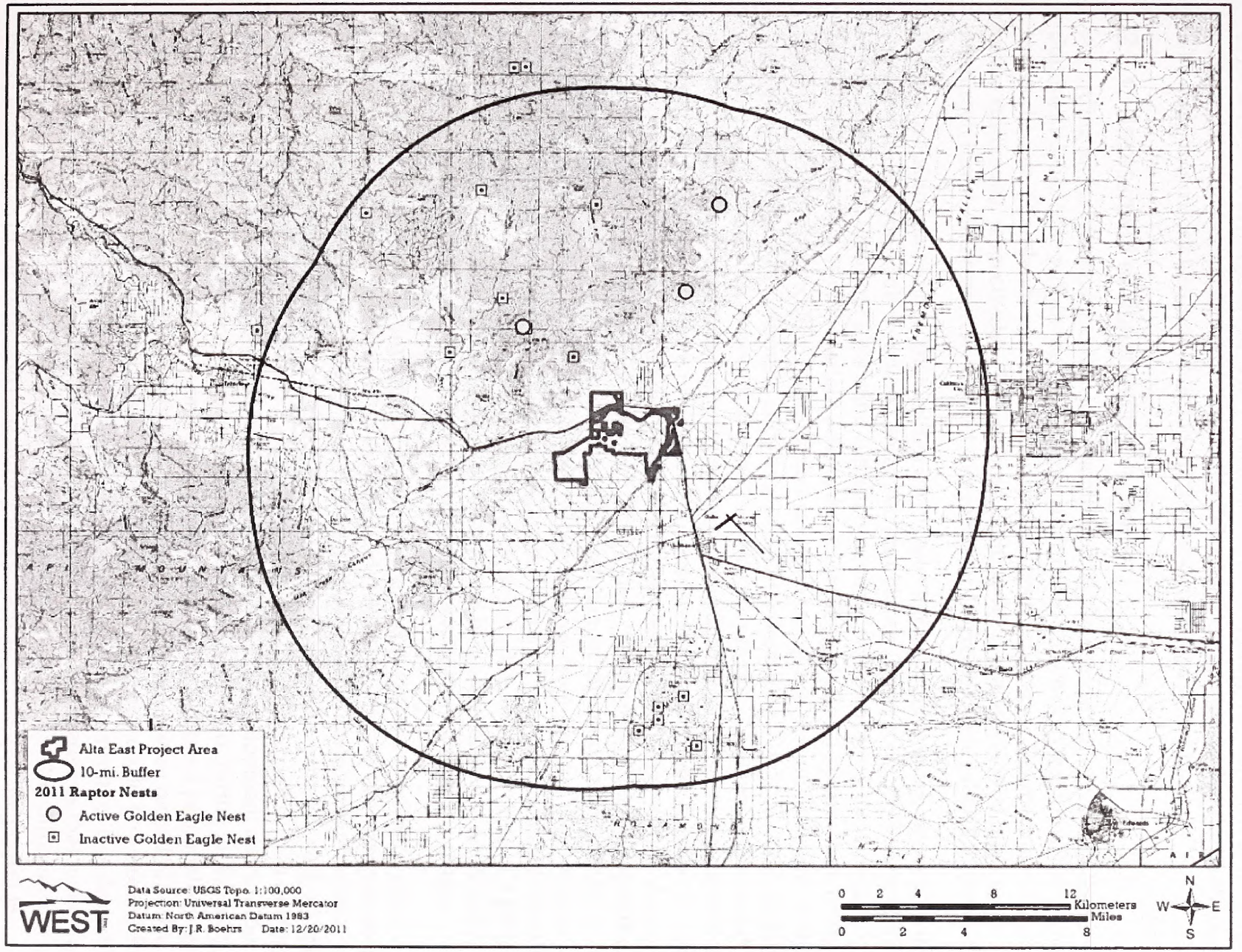
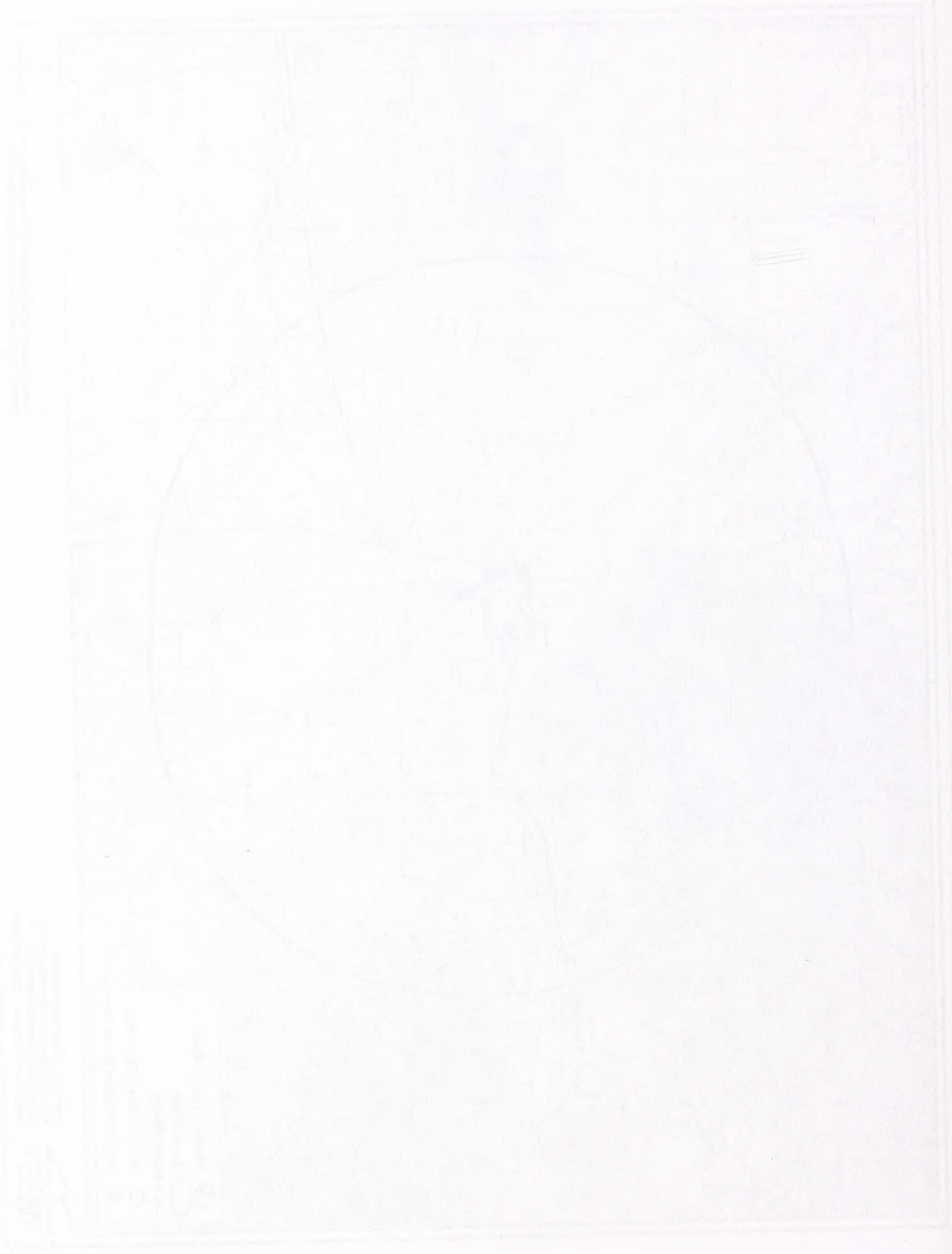


FIGURE 7
Golden Eagle Nesting Territory Survey Results, February and April, 2011
Alta East Wind Project
Alta Wind Energy Center Project



a follow-up survey completed on June 1, in which two young were observed in the nest 6.8 miles north and one was observed in the nest 3.8 miles north. The young were estimated to be between 7 to 8 weeks old. The persistence of these nesting territories in light of such substantial wind energy development in the Tehachapi area suggests that the likelihood of take and/or territory loss would be low in response to the proposed project.

2.2.3 Assessment of Nonbreeding Habitat

According to the National Land Cover Database (U.S. Geological Survey, 2001), the dominant cover type within the project area is scrub-shrub, which constitutes 96.7 percent of the study area. Grasslands and low-intensity developed areas are 1.3 percent and 1.0 percent of the study area, respectively. The remaining land cover types, developed open space, evergreen forest, and barren land constitute just over 1 percent of the project, combined.

Studies in California indicate that golden eagles select grasslands and oak savanna, with fewer eagles selecting oak woodland and open shrublands (Hunt et al., 1998). The Hunt et al. study is of the Altamont Pass wind resource area and was completed in response to USFWS concern that fatalities might adversely affect the golden eagle population in the region. It was not specifically a food/habitat selection study, but documents some of the highest nest densities in California and thus the habitat described indicates fairly optimal conditions. Alta East differs from this wind resource area in that it has few perches and potentially low small mammal and prey resource densities. Selection seems to depend on the availability of prey. Primary prey species for golden eagles are rabbit, hare, and rodents, but golden eagles also take other mammals, birds, reptiles, and scavenge a limited amount of carrion (Olendorff, 1976). California ground squirrels (*Spermophilus beecheyii*) and black-tailed jackrabbits (*Lepus californicus*) are the among the most important prey species for the golden eagle (Hunt et al., 1998). Eagles generally hunt prey from favored perches near regular updrafts, which allow soaring to heights sufficient for them to efficiently scan their hunting areas (Johnsgard, 1990). Although project prey studies were not done, the project area generally consists of habitats typically not selected by golden eagles. Additionally, no prominent or used perches were detected after careful evaluation of the project area.

A potential indicator of the importance of habitat in a particular area to golden eagles is the extent of use relative to other areas on the landscape. Data collected to evaluate this project area indicate that during the first 12-month period of evaluation, eagle use within the project area was distinctly different from the area observed to the north and west, where eagle use was documented. Of the 7 golden eagle groups (n = 11 birds) observed during the year 1 study, all were north and west of the area proposed for development and off the project area at survey points 4, 5, and 6. Observations were recorded during all seasons (spring, n=1 eagle; summer, n= 1; fall, n= 3; winter, n= 6) and suggested potentially higher use of these off site areas in winter (see Table 1) because no eagles were recorded at the survey points 1, 2, and 3 located onsite. This difference in eagle use could be associated with lower quality foraging habitat, lack of perch sites or foraging opportunities, less desirable thermal or wind characteristics, or by general land use activity differences that make the project area less attractive to eagles than the surrounding landscape. This difference in eagle use is measurable in the data collected during this period suggests that the project is well-sited with regard to minimizing risk of collision for eagles.

Although eight eagles were documented on the project site from October 7, 2010 to February 25, 2011, the seasonality of eagle use of the area proposed for WTGs indicate that this use is not associated with the nesting period. No use was recorded between February 25, 2012 and June 1, 2012, and no nests were recorded as active during the February 22, 2011 nest survey. While the winter observations may have included eagles from these nesting territories, all documented eagle use on the project site occurred during the period in which eagles were not actively nesting, incubating, or rearing chicks.

2.3 Stage 3 – Predicting Eagle Fatalities

Factors potentially associated with wind turbine collision risk for eagles are presented in the draft ECP guidance (USFWS, 2011). Some of these may be present during operation of the project and may include bird density, age, residency status, season, flight style, interaction with other birds, and hunting or presence of foraging opportunities. Information that conclusively defines the functional relationship of these factors to actual eagle mortality during operation is, for the most part, unavailable; however, these risk factors make intuitive sense and are therefore considered in AWD's assessment of risk. AWD's assessment and conclusions related to risk are based on the data collected from March 2009 to March 2011. Risk analysis and conclusions are summarized in Table 3 and described in more detail in the following sections.

TABLE 3
Assessment of Golden Eagle Risk Factors
Alta East Wind Project

Risk Factor	Analysis	Conclusion
Bird Density	Eagle use is very low when compared to other facilities with similar preconstruction data.	Low risk
Age	Age of individuals was estimated during point count surveys; however, inconsistent age determination and low detection rates preclude understanding of the age structure of eagles occasionally using the project area. Although age alone is an unreliable stand-alone indicator of risk for a variety of reasons, each age class may have its own particularly vulnerabilities that are dependent on a variety of other risk factors and circumstances. The data available from the two years of study do not indicate that nesting does not occur onsite and the presence of fledglings or juveniles that might potentially be more vulnerable to collision than other age classes are not common onsite.	Low Risk
Residency Status	Distance of nests from the project suggest nesting eagles occur in reasonable proximity to the site to present risk. Nesting territory occupants, and adult and juvenile floaters, may comprise the population of eagles using the site; however, this cannot be determined from the data available. No evidence of foraging or territorial behavior was observed on the project and the apparent spatial arrangement of nest territories indicated by the nesting survey results suggests that territorial behavior may be unlikely in or near the project.	Low Risk

TABLE 3
Assessment of Golden Eagle Risk Factors
Alta East Wind Project

Risk Factor	Analysis	Conclusion
Season	Potential relationship of eagle use with fall and winter season, as evidenced during fall 2010 and winter 2010/2011 avian use data. Foraging, perching, or consistent use of specific areas was not documented; however, seasonal and annual variability was evident.	Potential Seasonal Variation in Risk
Flight Style	Soaring and gliding is documented in and out of the altitudes associated with WTG collision risk; however, frequency of use is low and no higher-risk flight behaviors, such as hunting, kiting, soaring, or stooping were observed.	Low Risk
Interaction With Other Birds	With the exception of two juvenile eagles observed on Feb, 17, 2011, all observations were of individual birds. No evidence of territoriality o interaction with other eagles was observed	Low Risk
Hunting	Not observed.	Low Risk
Presence of Foraging Opportunities	Not observed, but likely present at times or in localized areas. Quantitative preybase studies were not completed; however indirect evidence (low raptor use, low overall avian use, few incidental observations of big game, livestock and small mammals, and no observations of unique concentrations of prey) supports the inference that prey concentrations and foraging opportunities are uncommon and/or localized.	Low Risk
Topographic Features for Slope Soaring	The majority of the project is flat and rugged topography is limited to the north and western edges. Slope soaring was not observed	Risk may vary with topography
Topographic Features for flight corridors	The majority of the project is flat and rugged topography is limited to the north and western edges. A possible connection with avian use point 3 may be evident; however, observed use was low and not specific to a particular corridor	Low Risk
Perch Structures	No perching eagles were detected. Additionally, no unique perch sites associated with topography or artificial structures are present on the project.	Low Risk

2.3.1 Collision Risk

Eagle density, age, residency status, time spent in zone of risk, season, flight style, interaction with other birds, and hunting or presence of foraging opportunities all may influence the likelihood of an eagle colliding with a WTG or other project feature. No eagles were observed within the project boundary during surveys completed from May 11, 2009 through September 2010, indicating that use of the project by eagles during this period was very limited. Because eagles were not detected using the project area during this time period, it is appropriate to conclude that eagle use of the project area was very low during this study period.

During the May 11, 2009 to May 6, 2010 evaluation period, eagle use within the project area was distinctly different from the area observed to the north and west, where eagle use was documented. This difference in eagle use between years could be associated with proximity to nesting territories during the nesting season or other factors, but may also indicate poor habitat quality on the project area, as described in Section 2.2.3, Assessment of Nonbreeding Habitat. Regardless of the cause, the difference in eagle use between years, and between the higher use area detected to the north and northwest of the project is measurable in the data collected, suggesting that the project area may provide less favorable habitat or less likely to be selected by eagles in the vicinity of the project than areas located to the north and northwest. Moreover, important foraging habitat and foraging use were not observed during two years of study, nor were the majority of the risk factors presented and discussed in Table 3, which indicates that collision risk to eagles is extremely low, and the project is well-sited from a landscape perspective with regard to minimizing risk of collision for eagles. Eagle territories could expand to include the project area during years in which prey resource distribution differs from that of the study period; however, during this study period, the project area was not preferred by eagles in the project vicinity.

No eagles were recorded on the project during two summers (2009 and 2010) and during winter 2009–2010. However, eagles were recorded during fall 2010 and winter 2010–2011. Low detection rates of eagles on the project area indicate that the area could be considered of low importance to the local population; however, regional assessment of golden eagle distribution would be necessary to determine this at the regional level. Minor-scale indirect impacts could be expected through potential displacement of a small number of eagles during project construction and operation; however, the likelihood of an eagle colliding with a WTG during operation is highly unlikely.

Field data analyzed to date indicate that topographic features within the project area are not conducive to slope soaring or creation of potential flight corridors. If such features were present, high mean use values by soaring species and/or birds exhibiting regular or seasonal movements through a particular area would have been detected in the two years of study. No foraging sites, roost sites, or perch structures have been identified after 22 months of study. Therefore, although minor eagle use is documented within the project area during baseline studies, the actual risk of collision with proposed WTGs is very low for eagles in the area. The low levels of documented use suggest that eagle density is very low and migration corridors or stopover habitat are not present onsite. Based on studies completed to date, it is appropriate to conclude that potential collision risk to eagles is very low.

2.3.2 Impacts to Nests or Nesting Territories

The nearest known eagle nest is located 3.0 miles northwest of the nearest proposed wind turbine. No eagle nests were documented within the project area, and use of the project is so low that although a nesting territory or territories may overlap the project area, it is unlikely that important habitats, which might be contained within nesting territories is included in the project area. Spring 2010 surveys indicate that the average inter-nest distance between the three occupied nesting territories adjacent to the project is approximately 5 miles. One-half the inter-nest distance has been used as an approximation for the territory boundary in a number of raptor studies (Thorstrom, 2001; Wichmann et al., 2003; Soutullo et al., 2006). Therefore, this distance can be used to delineate which nesting territories and

associated breeding and juvenile eagles are likely to be affected by the project, either through injury, mortality, or disturbance. Because no nests occupied in 2010 or 2011 are within 2.5 miles of the project no impacts on nesting territories are anticipated to result from project construction or operation using internest distance as an index to territory size. Although nests are within the 10 mile radius of the project, use by eagles of the area proposed for turbine installation is very low. This no impact determination to nesting territories is further supported by Hunt (2002), in which only 2 of 47 radiotagged breeders were killed by turbines in a radiotagged sample of 117 birds in the Altamont Wind Resource Area, suggesting that birds on nesting territories (breeders) are less vulnerable to collision.

Historical nest and territory data or population status or assessment data are not available from the USFWS to evaluate historical eagle territory locations in and near the project area and or the current status of golden eagles in the region (personal communication, Ashleigh Blackford, December 10, 2011); however, AWD has assessed the potential impacts on golden eagles in the absence of these data. Their conclusion is that impacts to nesting golden eagles are unlikely, and thus the productivity of the regional population will be unaffected by construction and operation of the project.

It is generally understood that nonbreeding eagles use areas on the margins of territories occupied by breeding adults (Watson, 1997; Hunt, 1998; Caro et al., 2010). These "floaters" have been shown to be more vulnerable to collision with turbine blades at wind energy projects than locally breeding adults and juveniles are (Hunt et al., 1999 and 2002); however, Hunt (2002) associates this risk with hunting of live prey behavior, which was not observed and is not common based on the data collected for the project. WTGs sited proximal to eagle nesting territories may pose risks to eagle populations because population stability is likely influenced by a robust nonbreeding cohort in the form of floaters, to replace breeding individuals that die. The systematic, observational point-count approach used to document frequency of eagle use of the project footprint, coupled with the results of the nesting territory analysis, suggest that some of the eagles on the project may be floaters. However, the frequency at which these potential floaters use the site, and the apparent lack of importance of the project area to eagles for foraging, roosting, or perching, suggest that potential impacts on floaters or non-nesting birds would not occur. .Based on studies completed to date, it is appropriate to conclude that risk of project impacts to nesting eagles, or floaters of any age, would be low and does not warrant mitigation actions.

2.3.3 Foraging Habitat Loss

During the first 12 months of evaluation, eagle use within the project area was distinctly different from that in the area observed to the north and northwest, where eagle use is documented. Subsequent data collected in fall 2010 and winter 2010 and 2011 indicate that eagles may use the project area at low levels during the nonbreeding season. It is also possible that established territories could expand to include the project area during years in which prey resource distribution differs from that during the study period. However, eagle foraging or perching was not detected on the project area, and use indices indicate low importance of this specific site for foraging eagles. Therefore, impacts on foraging habitat are expected to be minimal.

2.3.4 Wintering Habitat Use

Potential for seasonal variability in use of the project area exists, and data indicate that the project is likely more attractive to eagles in the fall and winter than during other times of the year. However, winter use of the project by eagles is very low; consequently, the importance of this wintering habitat is likely very low. Based on studies completed to date, it is appropriate to conclude that potential project impacts on important wintering habitat for eagles are expected to be minimal.

2.3.5 Fatality Estimates

The interaction of topographic features, seasons, and wind currents does not appear to create favorable conditions for slope soaring or kiting (stationary or near-stationary hovering) in the vicinity of the proposed turbines. Foraging or territorial behavior that might distract eagles using the project and presumably make them less vigilant has not been documented onsite. The number of recorded golden eagles has been uniformly low across all seasons.

Compared to other projects in California and Arizona, Alta East presents some of the lowest overall raptor use (Chatfield et al., 2010a and 2010b, 2011). Western Ecosystems Technology, Inc. compared annual mean raptor use at the project from May 2009 to May 2010 (Year 1 Study), which represents the period of highest eagle and during which no eagles were documented on the project site, with 39 other wind energy facilities that implemented similar protocols and had data for three or four seasons. The annual mean raptor use at these wind energy facilities ranged from 0.09 to 2.34 raptors/plot/20-minute survey. Based on the results from these wind energy facilities, a ranking of seasonal raptor mean use was developed and under this ranking, mean raptor use at the Alta East project (0.09 raptor/plot/20-minute survey) is considered to be very low, ranking second lowest compared to the 39 other wind energy facilities. Additionally, during the Year 2 study, for which eagles were documented onsite, mean use values for all raptors was similarly ranked third lowest of 44 comparable study areas. Very few recorded observations of eagles at the Alta East project preclude similar comparisons for eagles only; however, such low detection rates indicate very low risk of impacts to eagles.

During the May 2009–May 2010 avian use study, 26 percent (11 of 43) of raptor observations consisted of golden eagles; however, none of these occurred in the area where eagles would be considered at risk from the project. During summer 2010, in which avian survey points more accurately assessed the area proposed for WTG installation, no eagles were observed on the project. From July 10 through June 1, approximately 22 percent (8 of 36) of raptor observations consisted of eagles.

The discussion below evaluates fatality estimates using three different approaches: regression analysis, eagle use/mortality rate comparison, and collision risk modeling.

2.3.5.1 Regression Analysis

One method of estimating site-specific mortality predictions for eagles is to look at mean use for all raptors, and then look at the proportion of the overall raptor use attributed to golden eagles. Using methods described in Chatfield et al. (2010, 2011), a regression analysis of raptor use and mortality for 20 new-generation wind energy facilities, where similar methods were used to estimate raptor use and mortality, found that there was a significant

correlation between use and mortality (R^2 = 65%). Using this regression to predict overall raptor collision mortality at the project (based on an adjusted mean raptor use of 0.09 raptors/800-m/20-min survey) estimated for the project, yields an estimated fatality rate of less than 0.01 fatalities/MW/year or less than one raptor fatality per year for each 100-MW of wind-energy development (WEST 2012; Appendix B). A 90 percent prediction interval around this estimate is zero to 0.19 raptor fatalities per MW per year.

Golden eagle use accounted for approximately 22.2 percent of the observed raptor use at the AEWRA during the two years of study; therefore, assuming the proportion of eagles observed is related to the proportion of eagle mortality that would be expected, an eagle mortality rate of 0.0022 eagles/MW/year (0.0066 eagles/turbine/year), or 0.700 eagle fatalities per year, would be estimated for the proposed 318-MW wind energy project (Table 2). Using this prediction, project-wide eagle mortality would be approximately three to four eagles every five years. This approach is likely conservative because golden eagles are easier to detect than other raptor species; therefore, the proportion of raptor use attributed to golden eagles is likely overestimated due to higher detectability. It is also probable that collision risk for eagles is different than for other raptors.

This regression analysis currently one means of predicting raptor fatality, and AWD cannot identify any specific behaviors or risk factors that would cause the eagles present on the project to be at risk of collision fatality (see Table 3); therefore, eagle fatality would be predicted to be zero for the project using this method and AWD concludes that take of eagles is highly unlikely during operation.

2.3.5.2 Eagle Use/Mortality Rate Comparison

By comparing mean use values of eagles with projects where eagle take has been documented, and not documented, after robust fatality studies at 13 projects in western and Midwestern states, no take has been documented where annual eagle use values are less than 0.05/20-minute survey period (WEST 2012; Appendix B) Overall mean golden eagle use recorded at the Alta East project during the two years of study (0.02 eagles/800-m plot/20-min survey) is within the range of preconstruction eagle use values estimated for projects with no documented take of eagles during operation. This analysis strongly suggests that low, if any, golden eagle mortality would be expected in any given year at the AEWRA.

2.3.5.3 Collision Risk Modeling

A third approach to attempt to predict the frequency of eagle fatalities associated with a wind project is to use the modeling approach prescribed in the USFWS Draft Eagle Conservation Plan Guidance (USFWS 2011). Although substantial assumptions are used in this model that suggest a functional relationship between eagle use and behavior and risk of collision, using an assumed turbine specification of the Vestas V90-3.0 MW turbine and best and worst case scenarios of 99 and 95 percent avoidance rates, yields take estimates for Alta East of 0.114 golden eagle fatality per year (99% avoidance assumed) and 0.57 eagles/yr (95% avoidance assumed). These equate to less than one eagle fatality every 5 yrs to approximately 3 every five years for the proposed 300-MW project.

Each analysis presented above involves substantial assumptions; however, the three approaches generate project-wide fatality estimates for golden eagles ranging from zero to

0.7 eagle fatalities/yr. Although some golden eagle fatalities may occur, based on the use data and prediction models currently available to assess risk, it appears that the number of fatalities would likely be small. Overall eagle use of the project area is low, risk factors are determined to be rare or nonexistent on the site, and fatality of eagles would be expected to be highly unlikely, even without the incorporation of advanced conservation practices.

2.3.6 Cumulative Impacts

Typical activities that may be disruptive or detrimental to eagles occurring throughout the project region, although very limited on the project area, include illegal shooting, off-highway vehicle activity, loss of habitat to development through non-wind industry-related development, and general encroachment into nesting territories. AWD has not obtained information regarding the specific extent of these detrimental activities; however, each likely contributes to negative impacts on the regional eagle population.

Additional wind power projects are operating in the Tehachapi region. AWD is aware that eagle fatalities have been documented at the Pine Tree wind project approximately 7 miles north of the Alta East project, the Alite Project located approximately 10 miles east, and the Alta Oak Creek Mojave (AOCM) project located approximately 2 miles west. Although specifics about the date and age of the individual(s) killed are not available at each project, with the exception of AOCM where a juvenile eagle was killed during the winter season, it is possible that these impacts could influence the eagle territories documented within 10 miles of the project and thus influence the dynamics of the local eagle population.

The AOCM project consists of up to 720 MW of planned wind energy generation capacity—150 WTGs (300 MW) were installed during 2010. AOCM was granted state and county permits with USFWS input. This project is sited to minimize impacts on eagles and incorporates appropriate measures to detect or mitigate impacts on eagles should they occur. Baseline eagle use at this project site was very low relative to other projects in the geographic range of golden eagles, and comparable to that documented at Alta East.

For the purposes of this ECP, cumulative impacts on golden eagles could occur if the incremental impacts associated with the project are added to the impacts of past, present, and reasonably foreseeable future actions (identified above) in the vicinity of the project. Cumulative impacts could potentially result in an adverse effect on golden eagles in the region; however, no significant adverse project impacts are anticipated to affect eagles or their requisite habitats for nesting, foraging, or nonbreeding seasonal use as a result of construction or operation of the project. Furthermore, construction and operation best management practices (BMP) are presented in this plan to further minimize risk of project-related impacts and to mitigate impacts, if necessary. Therefore, the addition of the project as proposed, with measures implemented as presented in this plan, would result in no cumulative impacts on eagles.

2.4 Stage 4 – Advanced Conservation Practices

The analyses and documentation provided in this ECP show the project's risk to eagles is very low. However, this minimal risk can be further reduced through siting, construction, and operation measures, including mortality monitoring during operation and a plan of

action if eagles are taken during construction or operation. These advanced conservation practices (ACPs) are presented in the following sections.

2.4.1 Project Siting

Golden eagle use and nesting documented during baselines studies for the project were limited to the rugged topographical area north and west of the project area in 2009. The project site was modified in June 2010 to include additional area extending southward from the golden eagle use areas and extending development into the flat, nonrugged topography. The project includes repowering a historical wind power project site north of SR 58 on BLM lands and infilling existing wind facilities south of SR 58 in the area of Cameron Ridge. Overall, the project area presents a very low risk of direct impacts and the potential for very minor indirect impacts on golden eagles. The project is appropriately sited on the landscape as it relates to the impact on eagles.

2.4.2 Micrositing of Project Features

Baseline surveys for the project resulted in no documented use by golden eagles from May 11, 2009 to June 2010. The entire project was evaluated from July 1 2010 to October 7, 2011 and no eagle use was documented. Eagles were recorded in the project area during fall 2010 and winter 2010/2011. Therefore, although some eagle use of the project area may occur during construction or operation, no unique habitat features such as prominent perch sites (rock outcrops, cliffs, trees) or unique concentrations of prey are evident. Additionally, the area north and west of the project is documented as a location for which no direct or displacement impacts on eagles would be expected to occur. Cameron Ridge, in the western portion of the project and south of SR 58, has operating WTGs along the ridge. The ridge may have provided historic perch locations for eagles prior to development, but now, this ridge presents existing wind development Therefore, the proposed addition of three wind turbines along Cameron Ridge for this project is presented as optimal siting of turbines because the infill approach to development in this area is not likely to further affect potential eagle habitat, which is already degraded or nonfunctional as a result of previous development.

All other project features are located away from the higher elevation and rugged topography that is associated with the eagle use documented to the north and west of the project. Therefore, micrositing in response to eagle use or eagle habitat is not necessary for the remainder of the project features.

2.4.3 Construction Measures

Appropriate site-specific mitigation measures for golden eagles have been identified by AWD and include, but may not be limited to, measures specified in the following BMPs. These measures are consistent with those identified in BLM ROW grants received by the Applicant on nearby wind development projects, and applicable measures from the adjacent AOCM project. All potentially applicable measures from the above references are listed below. The BLM Wind Energy Programmatic Environmental Impact Statement also includes BMPs and mitigation measures for a plan of development and project design. Upon completion of the resources surveys and studies, applicable mitigation measures will be refined, and additional mitigation measures may be incorporated with input from BLM and USFWS.

Because courtship and nesting areas are not located in the project vicinity, construction activities would not need to be scheduled to avoid important periods of eagle nesting. If new nests or eagle use is detected during project construction, timing and avoidance measures would be implemented as appropriate in coordination with USFWS.

2.4.4 Minimizing Potential Habitat Disturbance

To mitigate habitat reduction or alteration during construction, the following measures shall be implemented:

- The size of all disturbed areas would be minimized.
- Where applicable, the extent of habitat disturbance would be reduced by keeping vehicles on access roads and minimizing foot and vehicle traffic through undisturbed areas.
- Habitat restoration activities would be initiated as soon as possible after construction activities are completed.
- Existing roads and utility corridors would be used to the maximum extent feasible.

2.4.5 Minimizing Potential Direct Disturbance

- Permanent meteorological towers, transmission towers, and other facility structures would be designed to discourage birds from perching or nesting on them (e.g., non-lattice towers, APLIC [2006] standards). Meteorological towers placed on BLM lands would adhere to BLM Guidelines.
- All guy wires installed on project structures, such as temporary meteorological towers, will be marked with bird flight diverters.
- All permanent meteorological towers will be free standing without the use of guy wires.
- Power lines would be configured to minimize the potential for electrocution of birds, by following established guidelines (e.g., Avian Power Line Interaction Committee [APLIC], 2006 and USFWS, 2005).
- Explosives would be used only within specified times and at specified distances from sensitive wildlife or surface waters as established by the BLM.
- If an injured or dead golden eagle is encountered during construction, AWD will stop work within the immediate vicinity. AWD will notify the USFWS before construction within the immediate vicinity is allowed to proceed.
- Prior to initial construction activities (e.g., mechanized clearing or rough grading), a qualified biologist will conduct a pre-construction sweep of the project site for golden eagle use. During these surveys the biologist will perform the following tasks:
  - Inspect the project area for eagles, nests, or signs of nesting or courtship behavior.
  - If an eagle, nest, or sign of nesting is discovered, measures will be taken to ensure that no impacts to these nests or individuals occur during construction.
- AWD will provide environmental training to all personnel working on the site during project construction. The training will include a review of golden eagle identification

and ecology to promote awareness and facilitate implementation of appropriate measures if an eagle is encountered or killed. If an eagle is encountered or killed, the appropriate employee will be required to contact the on-call biological services provider for the project.

2.4.6 Operation Measures

As part of AWD's mortality monitoring and reporting program, AWD will provide environmental training to all personnel working onsite during project operation. The training will include a review of golden eagle identification and ecology to promote awareness, and facilitate implementation of appropriate measures if an eagle is encountered or killed. The importance of onsite staff is significant in that they are onsite daily, can become familiar with how all wildlife move through and use the project site and vicinity, are the eyes and ears of environmental staff for identifying project risk or impact issues, and can help identify ways to reduce unexpected impacts if they are detected. Additionally, onsite management efforts, such as removing carcasses or limiting debris piles or food sources for potential prey, will reduce attractants to eagles, such as increased localized prey densities or other foraging opportunities (livestock carcasses).

Informal operational monitoring will be performed during the life of the project as a course of business by all AWD operations staff. Staff will be required to report all eagle observations, nesting behavior, and nests, and record fatalities and injuries. While this monitoring will not be statistically based, it will allow detection of issues that may potentially occur onsite.

Formal operational monitoring and reporting measures will also be implemented and are described in detail in Section 2.5, Stage 5 – Post-construction Monitoring. If an eagle is encountered or killed during project operations, the employee involved will be required to implement the appropriate response protocol, which will include notification of USFWS.

2.5 Stage 5 – Post-construction Monitoring

Post-construction monitoring will enable AWD to document eagle fatalities if they occur and identify factors associated with eagle fatalities that might warrant additional ACPs to specifically address the identified risk factor. Likewise, the monitoring program would enable potential improvement or elimination of ACPs found to be ineffective. Implementation of the proposed monitoring program will help USFWS, BLM, and AWD to evaluate the effectiveness of the ACPs. As part of AWD's mortality monitoring and reporting program, AWD will complete post-construction monitoring and reporting to determine whether baseline predictions of no impacts on eagles are consistent with operational outcomes. The monitoring program is explained below.

2.5.1 Fatality Studies

AWD or its representatives will perform post-construction eagle mortality monitoring in the first, third, and fifth years following the initial operation of the project, to demonstrate that the level of incidental injury and mortality does not result in an unanticipated long-term decline in populations of eagles in the region. Monitoring would be ceased, expanded, or

continued in response to the data collected. Post-construction mortality monitoring will include a mortality analysis, which will be conducted as follows:

- AWD will provide BLM and USFWS with the results of the mortality study for eagles annually. A qualified biologist will conduct mortality monitoring using a statistically significant sample size of operational turbines within the project area, not to exceed 33 percent of the WTGs. Depending on the results of the monitoring, more or fewer turbines may be monitored each subsequent year of study.
- All golden eagle fatalities will be reported to USFWS and BLM within 24 hours of detection. Such reports would include GPS location, photographs, and related information describing the incident.
- The mortality analysis will note species number, location, distance from the turbine for each recovered eagle, and apparent cause of mortality.
- The mortality monitoring will follow standardized guidelines outlined by the CEC and will include carcass scavenging and searcher efficiency trials. If improved field or data analyses methods become generally accepted practice by the wind and wildlife scientific community, and are deemed acceptable by AWD's avian biologists, such methods will be implemented for the project.
- The results of the mortality analysis will be provided to USFWS. At a minimum, the mortality analysis will consider the following:

  i) Number of annual eagle mortalities per turbine
  ii) Comparison to existing data on wind farm mortality

- If after the post-construction eagle mortality monitoring completed during the fifth year of operation, data indicate that the project is resulting in unanticipated significant adverse impacts on the population of eagles or is significantly interfering with any eagle social or behavioral dynamic, the project proponent will consult with USFWS and BLM as described in Section 3.0, Adaptive Management.

2.5.2 Nesting/Breeding Monitoring

- AWD or its representative will conduct post-construction breeding monitoring of eagle territories within 10 miles of the project in the first and third years following the project's initial operation. Post-construction breeding monitoring will include aerial surveys completed in accordance with the USFWS 2010 Inventory and Monitoring Protocol recommendations (Pagel et al., 2010). Survey results will be provided annually to BLM and USFWS.
- If the project results in a level of incidental injury and mortality to eagles, AWD will undertake supplemental compensatory measures to support regional conservation of migratory birds in accordance with measures presented in Section 3.0, Adaptive Management.

SECTION 3.0

Adaptive Management

3.1 Accounting for Policy Changes

With the implementation of BLM IM 2010-156 and the publication of draft policies in the Federal Register on February 18, 2011, regarding golden eagle take permitting and ACPs, it is understood that commitments made in this ECP may require adaptation relative to the forthcoming guidance. AWD would work collaboratively with BLM and USFWS to apply necessary policy changes to the project ECP.

3.2 Agency Coordination

All study results pertaining to golden eagles will be provided to USFWS and BLM on an annual basis.

SECTION 4.0

References

Avian Power Line Interaction Committee (APLIC). 2006. Suggested practices for avian protection on power lines: the state of the art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington D.C. and Sacramento, CA, USA. http://www.aplic.org/SuggestedPractices2006(LR-2watermark).pdf.

California Department of Fish and Game (CDFG). 2009. California Natural Diversity Database. Web site: http://www.dfg.ca.gov/biogeodata/cnddb/

California Energy Commission (CEC). 2007. California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development. CEC-700-2007-008-CMF. October.

California Native Plant Society (CNPS). 2009. Inventory of Rare and Endangered Plants. Web site: http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi.ca/pdf/pdfs/cdd_pdfs/wemo_pdfs.Par.4dfb777.file: wemo_rod_3-06.pdf

Caro, J., D. Ontiveros, M. Pizarro, and J. M. Pleguezuelos. 2010. Habitat Features of Settlement Areas Used by Floaters of Bonelli's and Golden Eagles. Bird Conservation International. Available on CJO 23 Apr 2010 doi:10.1017/S0959270910000213.

Chatfield, A., W. P. Erickson, and K. Bay. 2010a. *Wildlife Baseline Studies for the Sun Creek Wind Resource Area, Kern County, California. Final Report: May 2009 – May 2010.* Prepared for CH2M HILL, Oakland, California. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Chatfield, A., W. P. Erickson, and K. Bay. 2010b. *Baseline Avian Studies for the Alta East Wind Resource Area, Kern County, California. Interim Report, July 10 – August 31, 2010.*

Chatfield, A., W. P. Erickson, and K. Bay. 2010c. *Baseline Avian Studies for the Alta East Wind Resource Area, Kern County, California, Summer- Fall Interim Report, July 10 – November 12, 2010.*

Hunt, G. 2002. *Golden Eagles in a Perilous Landscape: Predicting the Effects of Mitigation for Wind Turbine Bladestrike Mortality.* California Energy Commission Report P500-02-043F. Sacramento, California.

Hunt, W. G. 1998. "Raptor Floaters at Moffat's Equilibrium." *Oikos* 82:191-197.

Hunt, W. G., R. E. Jackman, T. L. Brown, and L. Culp. 1999. *A Population Study of Golden Eagles in the Altamont Pass Wind Resource Area: Population Trend Analysis 1994-1997.* Report to National Renewable Energy Laboratory, Subcontracts XAT-5-15174-01, XAT-6-16459-01. Predatory Bird Research Group. University of California, Santa Cruz, California.

Hunt, W. G., R. E. Jackman, T. L. Brown, D. E. Driscoll, and L. Culp. 1998. A population study of golden eagles in the Altamont Pass Wind Resource Area: population trend analysis 1997. Report to National Renewable Energy laboratory, Subcontract XAT-6-16459-01. Predatory Bird Research Group, University of California, Santa Cruz, California.

Johnsgard, P. A., 1990. "Hawks, Eagles, & Falcons of North America." p. 260-268. Washington and London: Smithsonian Institution Press.

Olendorff, R. R. 1976. "The Food Habits of North American Golden Eagles." *Am. Midi. Nat.* 95:231-236.

Pagel, J. E., D. M. Whittington, and G. T. Allen. 2010. *Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols and other Recommendations in Support of Golden Eagle Management and Permit Issuance.* Division of Migratory Bird Management, U.S. Fish and Wildlife Service.

Reynolds, R. T., J. M. Scott, and R. A. Nussbaum. 1980. "A Variable Circular-Plot Method for Estimating Bird Numbers." *Condor* 82(3): 309-313.

Soutullo, A., V. Urios, M. Ferrer, and S. G. Penarrubia. 2006. "Post-Fledging Behaviour in Golden Eagles *Aquila chrysaetos*: Onset of Juvenile Dispersal and Progressive Distancing from the Nest." *Ibis* 148:307-312.

Thorstrom, R. 2001. "Nest-site Characteristics and Breeding Density of Two Sympatric Forest-Falcons in Guatemala." *Ornitologia Neotropical* 12:337–343, 2001.

U.S. Bureau of Land Management (BLM). 1999. California Desert Conservation Area Plan of 1980. Amended 1999.

U.S. Bureau of Land Management (BLM). 2001. Special Status Species Management Manual 6840. Available online at: http://www.blm.gov/pgdata/etc/medialib//blm/ca/pdf/pdfs/pa_pdfs/biology_pdfs.Par.9d22a8ee.File.pdf/6840_ManualFinal.pdf

U.S. Bureau of Land Management (BLM). 2005. *Final Environmental Impact Report and Statement for the West Mojave Plan, A Habitat Conservation Plan and California Desert Conservation Area Plan Amendment.* January. Web site: http://www.blm.gov/pgdata/etc/medialib//blm/

U.S. Fish and Wildlife Survey (USFWS). 2011. *Draft Eagle Conservation Plan Guidance.* http://www.fws.gov/windenergy/docs/ECP_draft_guidance_2_10_final_clean_omb.pdf]

U.S. Geological Survey. 2001. National Land Cover Database. Land Use/Land Cover. USGS Headquarters, USGS National Center. Reston, Virginia.

Watson, J. 1997. *The Golden Eagle.* 1st ed. T. and A. D. Poyser: London, U.K.

Wichmann, M. C., F. Jeltsch, W. R. J. Dean, K. A. Moloney, and C. Wissel. 2003. "Implication of Climate Change for the Persistence of Raptors in Arid Savanna." *Oikos* 102:186-202.

Appendix A
USFWS Letter of Concurrence

APPENDIX A

USFWS Letter of Concurrence

This attachment will be provided in a later submittal

Appendix B
Alta East Golden Eagle Fatality Predictions
Western Ecosystems Technology, Inc.
Technical Memorandum

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Phone: 307.634.1756 • Fax: 307.637.6981 • Website: www.west-inc.com

TECHNICAL MEMORANDUM

Golden Eagle Fatality Predictions for the Proposed Alta East Wind Resource Area Kern County, California

Submitted by:
Western EcoSystems Technology, Inc.

February 3, 2012

INTRODUCTION

From May 11, 2009 through June 1, 2011, on behalf of CH2M HILL Engineers, Inc. and Alta Windpower, LLC, Western EcoSystems Technology, Inc. (WEST) conducted baseline avian studies at the Alta East Wind Resource Area (AEWRA) in Kern County, California. These surveys were designed to document avian use patterns, identify potential risk issues, and assist with siting turbines to minimize impacts to avian resources. Because use of the AEWRA and adjacent areas by golden eagles (*Aquila chrysaetos*) was documented, and golden eagle nests were located in the surrounding landscape, the proposed project's potential impacts to eagles are important to understand in regard to developing a defensible risk characterization, which may (or may not) lead to an Eagle Conservation Plan and application for a programmatic take permit. The purpose of this document is to utilize the two years of site-specific baseline avian use data to provide golden eagle fatality predictions for the AEWRA. The results of these analyses indicate that a wind energy facility at the AEWRA would potentially take eagles at a rate of less than one per year. This memorandum summarizes the fatality prediction approaches and results.

STUDY AREA

The proposed AEWRA is located in southeastern Kern County, approximately two miles (3.2 kilometers [km]) north-northwest of the unincorporated city of Mojave, and 10 miles (16 km) east

of the city of Tehachapi. The study area comprises undeveloped rangeland on a combination of privately-owned land and land administered by the Bureau of Land Management.

The AEWRA falls within the high desert plains and hills on the western edge of the Mojave Desert. The Tehachapi Mountains are located to the north and west of the study area and transition into Mojave Desert towards the south and east. Elevations within the study area range from approximately 3,100 to 4,200 feet (ft; 940 to 1,280 meters [m]) above sea level, with the highest elevations occurring in the northern portion of the study area (Figure 1). The habitat ranges from lowland creosote (*Larrea tridentata*) scrub and Joshua tree (*Yucca brevifolia*) woodland in the southeast to juniper (*Juniperus* spp.) shrubland on the steeper, rocky slopes in the north. Water within the AEWRA is limited to a network of ephemeral drainages; there are no perennial surface water sources within the study area. Highway 58 bisects the AEWRA, an underground portion of the Los Angeles Aqueduct runs along the southeast corner of the study area, and a network of dirt roads and off-highway vehicle (OHV) trails run throughout the study area (Figure 1).

The project will consist of up to 106 3-megawatt (MW) model wind turbine generators (WTGs) and ancillary facilities for a total nameplate capacity of 318 MW. The WTGs planned for the project (Vestas V90-3.0 MW) have a wind-swept rotor diameter of 295 feet (90 m). The highest point of the rotor blade rotation is 410 feet (125 m) and the ground clearance for the rotor blades at their lowest point of rotation is 115 feet (35 m).

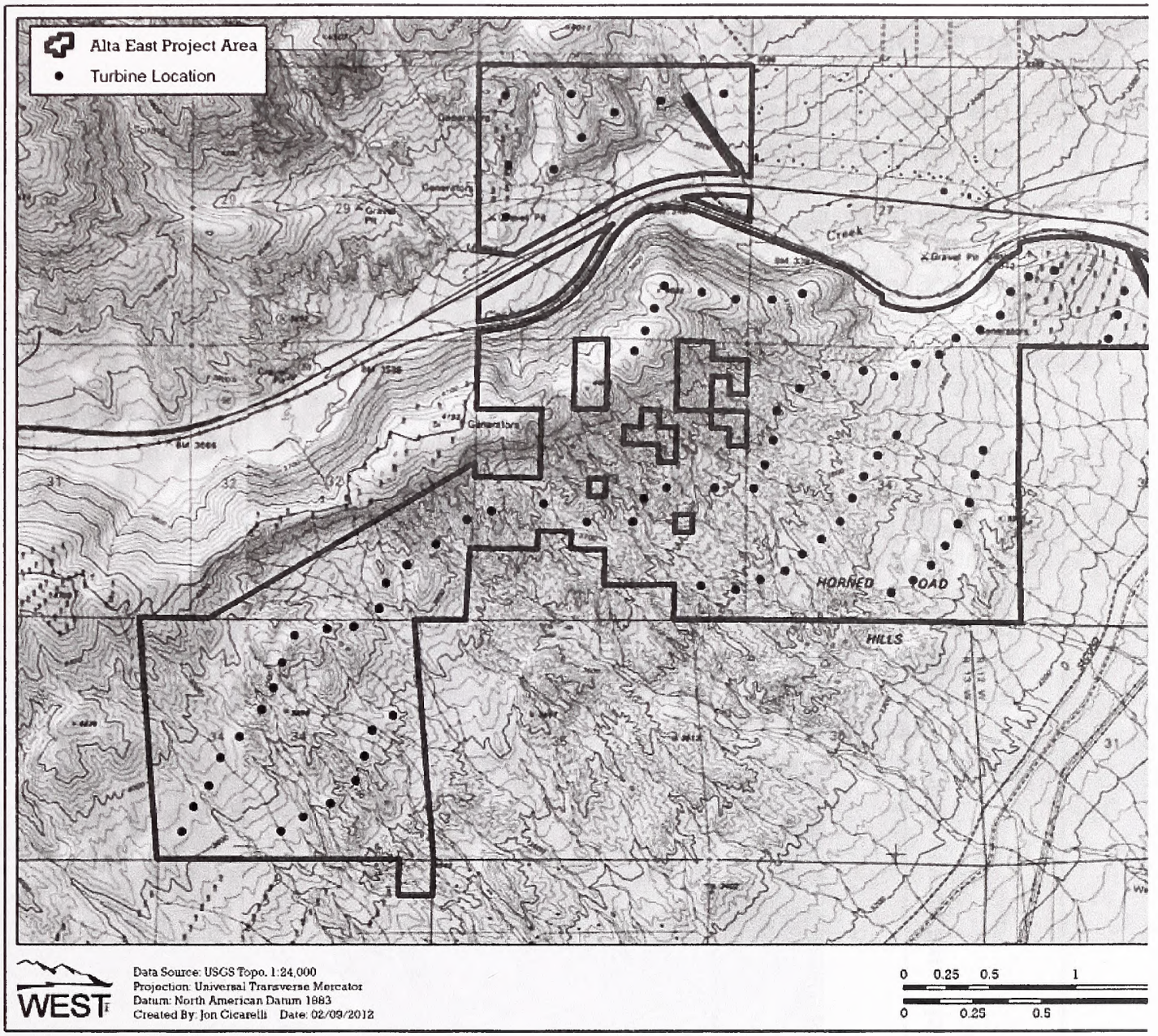


Figure 1. Map of the Alta East Wind Resource Area showing proposed turbine layout.

SITE-SPECFIC AVIAN USE SURVEYS

This golden eagle risk assessment is based on golden eagle observational data collected over two years of fixed-point avian use surveys conducted at the AEWRA in 2009/2010 and 2010/2011. The objective of the surveys was to estimate the seasonal and spatial use of the study area by birds, particularly diurnal raptors, defined here as kites, accipiters, buteos, harriers, eagles, falcons, and ospreys. The methods for those surveys are briefly described below. See Chatfield et al. (2010, 2011) for a more detailed explanation of how avian use data were collected and analyzed.

Survey Plots

Fixed-point avian use surveys (variable circular plots) were conducted using methods described by Reynolds et al. (1980). During both years of the study, six points were selected to survey representative habitats and topography of the study area while providing relatively even coverage (Figure 2). Each survey plot was an 800-m (2,625-ft) radius circle centered on the point. To the extent possible, survey stations were selected to be consistent between the two years of study; however, due to changes to land access and changes to the project boundary, points 4, 5, and 6 were relocated for the second year of surveys to more accurately assess the area currently planned for wind turbine installation (Figure 2). For the purposes of this risk assessment, golden eagle use data collected at survey points 5 and 6 during the first year of study (2009/10; see Chatfield et al. 2010) were not used in the fatality predictions because the survey plots and viewsheds lie entirely outside of the current project boundary.

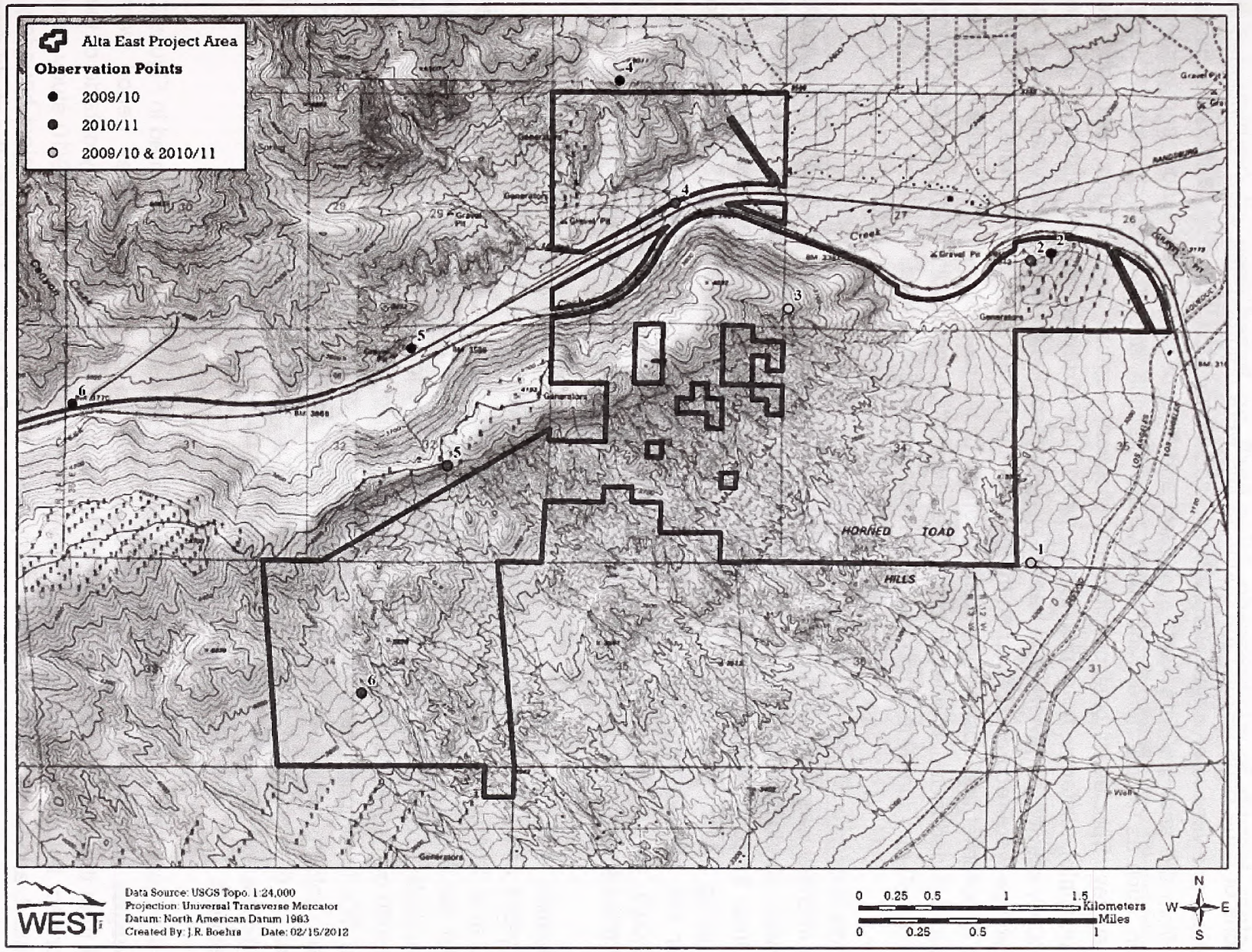


Figure 2. Locations of fixed-point bird use survey stations during the 2009/10 and 2010/11 survey periods at the Alta East Wind Resource Area.

Survey Methods

All species of birds observed during each 30-min fixed-point survey were recorded. Observations of large birds beyond the 800-m radius were recorded, but were not included in the statistical analyses. For small birds, observations beyond a 100-m (328-ft) radius were excluded from the analysis. The date, start, and end time of the survey period, and weather information, such as temperature, wind speed, wind direction, and cloud cover, were recorded for each survey. Species or best possible identification, number of individuals, sex and age class (if possible), distance from plot center when first observed, closest distance, altitude above ground, activity (behavior), and habitat(s) were recorded for each observation. Behavior and habitat type were recorded based on the point of first observation. Approximate flight height and flight direction at first observation were recorded to the nearest 5-m (16-ft) interval. Other information recorded included whether or not the observation was auditory only and the 10-min interval of the 30-min survey in which the observation was initially noted.

Observation Schedule

Sampling intensity was designed to document seasonal bird use within the AEWRA. Fixed-point surveys were conducted from May 11, 2009 through May 6, 2010 and from July 10, 2010 through June 1, 2011. Surveys were conducted approximately once per week during each season: spring (March 1 to May 31), summer (June 1 to August 31), fall (September 1 to November 15), and winter (November 16 to February 28). Surveys were carried out during daylight hours, and survey periods varied to approximately cover all daylight hours during a season. To the extent practical, each point was surveyed about the same number of times.

Survey Results

The two years of avian use surveys completed at the AEWRA in 2009/2010 and 2010/2011 (Chatfield et al. 2010, 2011) resulted in a combined diurnal raptor use estimate of 0.09 birds per 800-m plot per 20-minute survey period (Table 1). For golden eagles, the estimated use was 0.02 birds/plot/20-min survey (Table 1). Seasonal mean use for golden eagles ranged from zero eagles/plot/20-min survey during the spring and summer of 2011 to 0.05 during the winters of 2010 and /2011. Although each point was surveyed for 30 minutes during each visit, diurnal raptor and golden eagle use estimates have been adjusted to 20 minutes to allow for comparison to data collected at other wind energy projects by using only the first 20 minutes of each 30 minute survey period. It should be noted that no eagle observations were excluded via this adjustment.

Mapped flight paths for all golden eagles observed during the surveys are presented in Figure 2. Golden eagles observed at survey points 5 and 6 from the 2009/10 survey period were excluded from the analysis as these survey plots and their viewsheds lie entirely outside of the current project boundary. While eagles observed from point 4 during the 2009/10 study, and from points 1 and 5 during the 2010/11 study were outside of the current project boundary, these observations were included in the risk assessment due to their proximity to the study area and to allow for a more conservative estimate of take.

Table 1. Seasonal and overall mean use (observations per 800-m plot per 20-min survey) by year based on fixed-point observations of diurnal raptors and golden eagles at the Alta East Wind Resource Area.

Season	Year	Diurnal Raptors	Eagles
Spring	2010	0.05	0.01
	2011	0.13	0
	Mean	*0.09*	*0.01*
Summer	2010	0.03	0.01
	2011	0.03	0
	Mean	*0.03*	*0.01*
Fall	2010	0.03	0
	2011	0.12	0.01
	Mean	*0.08*	*0.01*
Winter	2010	0.17	0.05
	2011	0.18	0.05
	Mean	*0.17*	*0.05*
Overall	2010	0.07	0.02
	2011	0.12	0.02
	Mean	*0.09*	*0.02*

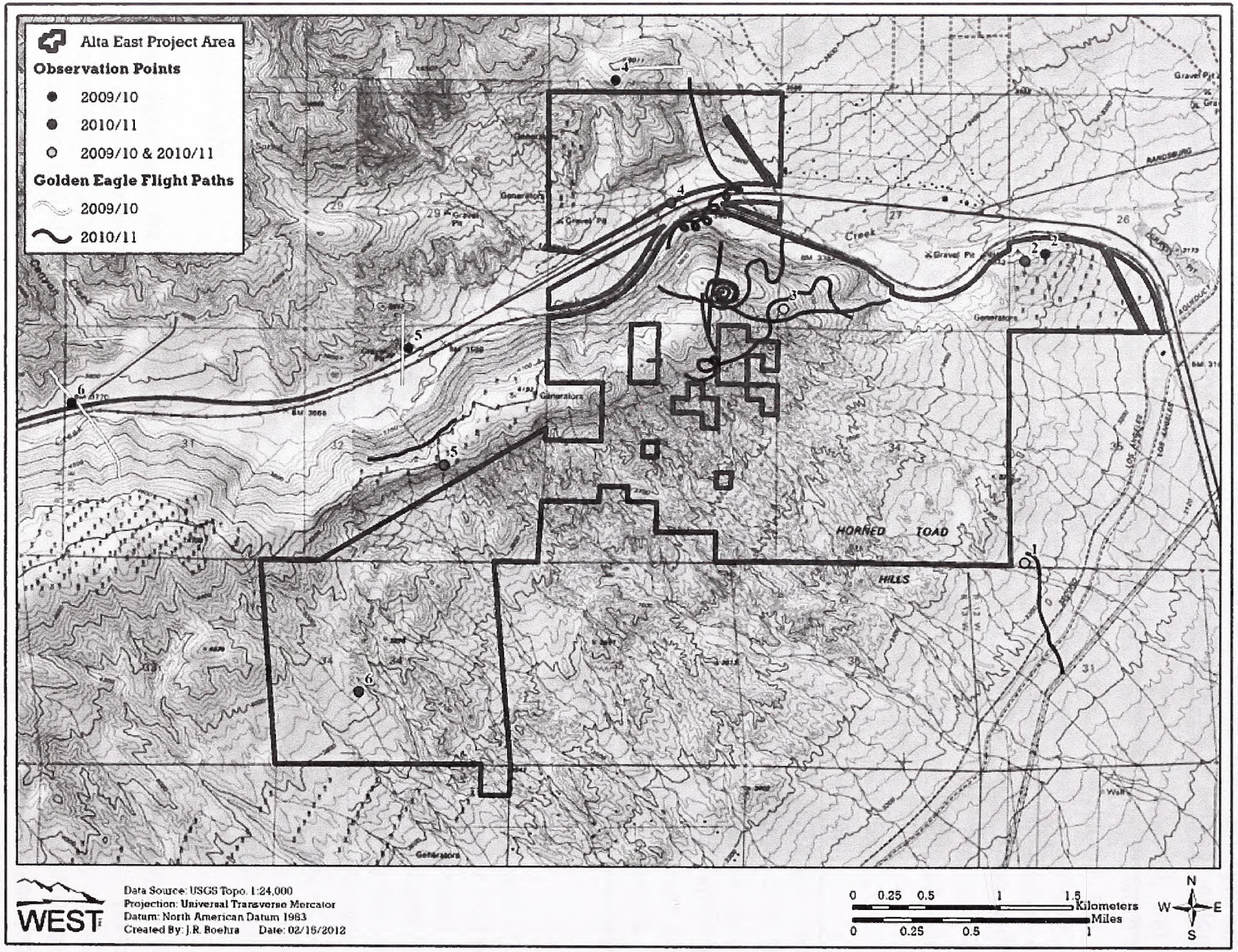


Figure 3. Approximate flight paths of golden eagles observed during the 2009/10 and 2010/11 bird use surveys at the Alta East Wind Resource Area.

FATALITY PREDICTIONS

In this report, we present three different approaches for predicting the expected level of annual golden eagle mortality at the AEWRA. The first approach examines the level of mortality observed at other wind projects in the western and Midwestern US in comparison to the level of golden eagle use at those projects, and correlates with these findings the golden eagle use observed at the AEWRA during two years of site-specific baseline avian use surveys (see Chatfield et al. 2010, 2011). The second approach to estimating potential golden eagle mortality involves estimating site-specific mortality predictions for all raptors, as described in Chatfield et al. (2010, 2011), and then looking at the proportion of those raptor observations that were golden eagles. The third approach applies the collision risk modeling technique prescribed in the USFWS Draft Eagle Conservation Plan Guidance (USFWS 2011).

Approach 1: Eagle Use / Mortality Rate Comparisons

This approach compares golden eagle use of the AEWRA with golden eagle use at currently operating wind energy facilities in the western and Midwestern US and the level of eagle mortality observed at those facilities. In Figure 4 below, golden eagle use at 13 western and Midwestern wind energy projects is presented in two columns: projects with no recorded golden eagle mortality and projects where eagle mortality has been documented. The data reported in Figure 4 are from wind energy facilities that implemented similar protocols to the avian use surveys conducted at the AEWRA, and have survey results for at least four seasons. Overall mean golden eagle use recorded at the AEWRA during the two years of study (0.02 eagles/800-m plot/20-min survey) is closer to the mean golden eagle use observed at facilities on the left side of Figure 4, where no recorded fatalities have been reported, than to the right side where golden eagle fatalities have been recorded. This suggests that low, if any, golden eagle mortality would be expected in any given year at the AEWRA. However, the actual level of use and the likelihood of mortality in a given year may be influenced by whether or not territories near the AEWRA are occupied and nests are successful. Based on seasonal use of the AEWRA by eagles during the two years of study, risk of mortality is expected to be highest in the winter (Table 1).

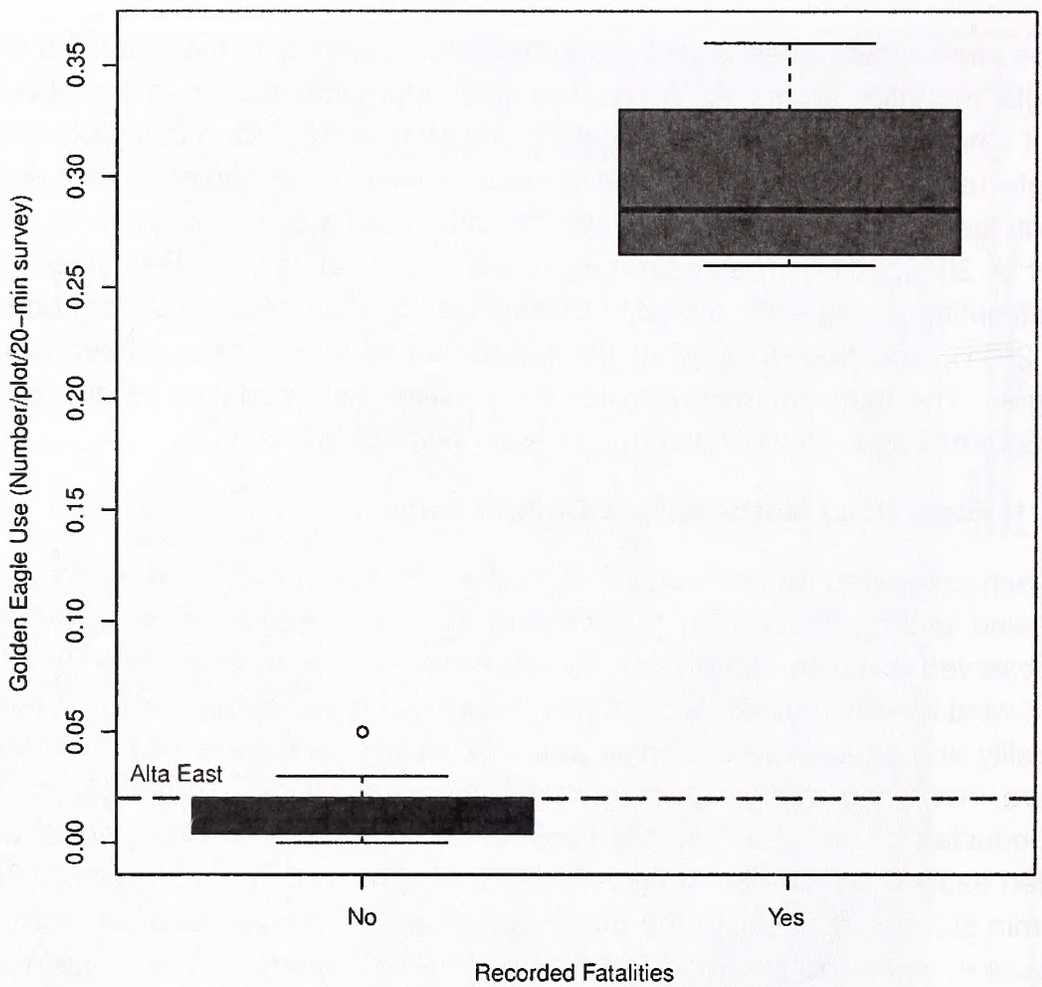


Figure 4. Average pre-construction golden eagle use values for wind energy facilities with and without observed golden eagle fatalities.

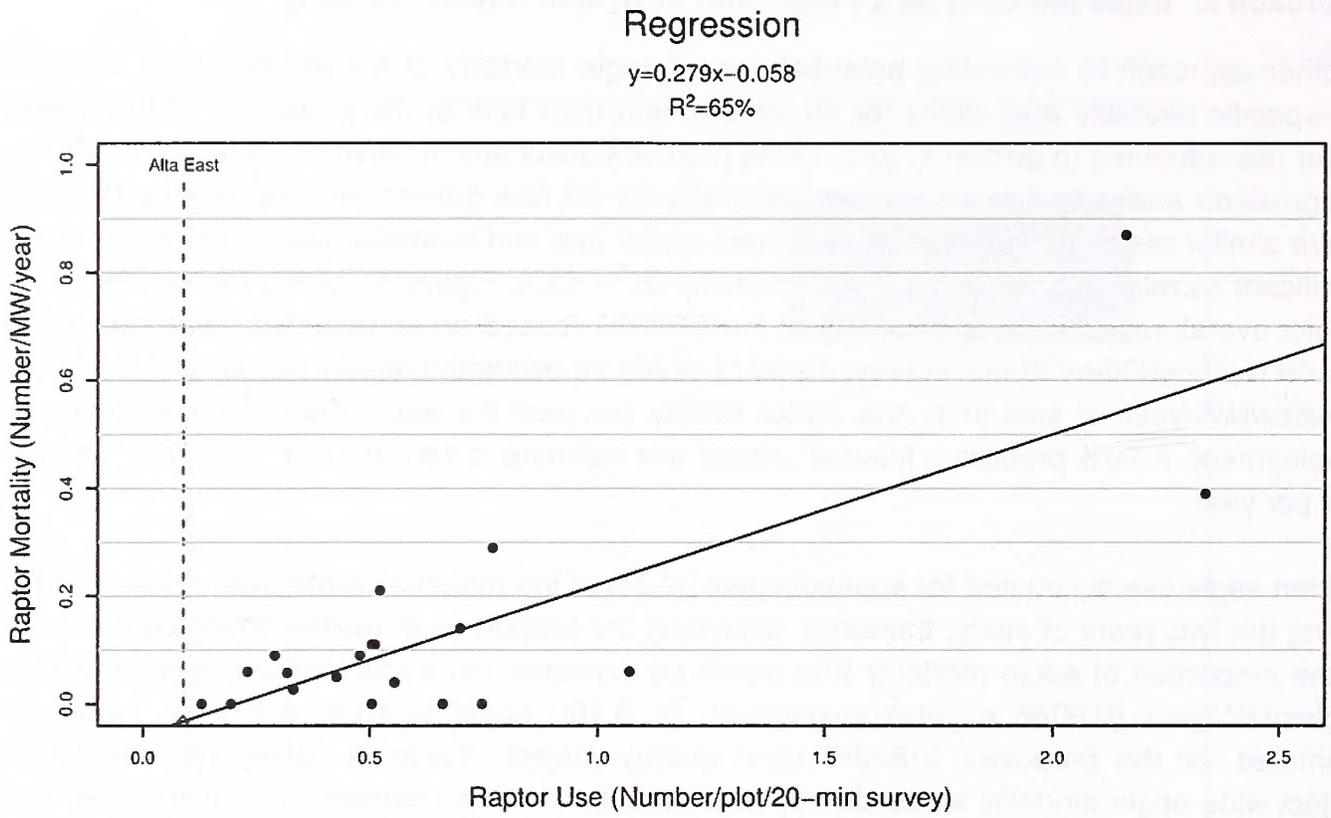
Data from the following sources:

Wind Energy Facility	Golden Eagle Use	Use Reference	Golden Eagle Fatality	Fatality Reference
Alta East, CA	0.02	Chatfield et al. 2010, 2011		
Campbell Hill, WY	0.36	Taylor et al. 2008	Yes	Taylor et al. 2011 In Press
Diablo Winds, CA	0.3	WEST 2006	Yes	WEST 2006, 2008
Elkhorn, OR	0.27	WEST 2005a	Yes	Enk et al. 2011 In Press
Foot Creek Rim, WY	0.26	Johnson et al. 2000b	Yes	Young et al. 2003b
Wild Horse, WA	0.05	Erickson et al. 2003c	No	Erickson et al. 2008
Combine Hills, WA	0.03	Young et al. 2003c	No	Young et al. 2006
Leaning Juniper, OR	0.02	Kronner et al. 2005	No	Kronner et al. 2007; Gritski et al. 2008
Hopkins Ridge, WA	0.01	Young et al. 2003	No	Young et al. 2007
Stateline, OR/WA	0.01	Erickson et al. 2002b	No	Erickson et al. 2004b
Vansycle, OR	0.01	Erickson et al. 2002b	No	Erickson et al. 2000
Klondike, OR	>0.01	Johnson et al. 2002	No	Johnson et al. 2003
Nine Canyon, WA	>0.01	Erickson et al. 2001	No	Erickson et al. 2003b
Grand Ridge, IL	0	Derby et al. 2009	No	Derby et al. 2010b

Approach 2: Eagle Mortality as a Proportion of Overall Raptor Mortality

Another approach to estimating potential annual eagle mortality at the AEWRA is to estimate site-specific mortality predictions for all raptors, and then look at the proportion of the overall raptor use attributed to golden eagles. Using methods described in Chatfield et al. (2010, 2011), a regression analysis of raptor use and mortality for 20 new-generation wind energy facilities, where similar methods were used to estimate raptor use and mortality, found that there was a significant correlation between use and mortality (R^2 = 65%; Figure 5). Using this regression to predict overall raptor collision mortality at the AEWRA (based on an adjusted mean raptor use of 0.09 raptors/800-m/20-min survey; Table 1) yields an estimated fatality rate of less than 0.01 fatalities/MW/year or less than one raptor fatality per year for each 100-MW of wind-energy development. A 90% prediction interval around this estimate is zero to 0.19 raptor fatalities per MW per year.

Golden eagle use accounted for approximately 22.2% of the observed raptor use at the AEWRA during the two years of study; therefore, assuming the proportion of eagles observed is related to the proportion of eagle mortality that would be expected, an eagle mortality rate of 0.0022 eagles/MW/year (0.0066 eagles/turbine/year), or 0.700 eagle fatalities per year, would be estimated for the proposed 318-MW wind energy project (Table 2). Using this prediction, project-wide eagle mortality would be approximately three to four eagles every five years. This approach is likely conservative because golden eagles are easier to detect than other raptor species; therefore, the proportion of raptor use attributed to golden eagles is likely overestimated due to higher detectability. It is also probable that collision risk for eagles is different than for other raptors.



Overall Raptor Use: 0.09 raptors/800-m plot/20-min survey
Predicted Fatality Rate < 0.01 fatalities/MW/year
90.0% Prediction Interval (0, 0.19 fatalities/MW/year)

Figure 5. Regression analysis comparing raptor use estimations versus estimated raptor mortality.

Data from the following sources:

Wind Energy Facility	Raptor Use (birds/plot /20-min survey)	Reference	Raptor Fatality Rate (fatalities/MW/yr)	Reference
Diablo Winds, CA	2.16	WEST 2006	0.87	WEST 2006, 2008
High Winds, CA	2.34	Kerlinger et al. 2005	0.39	Kerlinger et al. 2006
Tuolumne, WA	0.77	Johnson et al. 2006	0.29	Enz and Bay 2010
Leaning Juniper, OR	0.52	Kronner et al. 2005	0.21	Kronner et al. 2007
Hopkins Ridge, WA	0.70	Young et al. 2003a	0.14	Young et al. 2007
Bighorn, WA	0.51	Johnson and Erickson 2004	0.11	Kronner et al. 2008
Klondike II, OR	0.50	Johnson 2004	0.11	NWC and WEST 2007
Stateline, OR/WA	0.48	Erickson et al. 2003a	0.09	Erickson et al. 2004
Wild Horse, WA	0.29	Erickson et al. 2003c	0.09	Erickson et al. 2008
Elkhorn, OR	1.07	WEST 2005a	0.06	Jeffrey et al. 2009b
Wessington Springs, SD	0.23	Derby et al. 2008	0.06	Derby et al. 2010a
Biglow Canyon, WA	0.32	WEST 2005b	0.06	Jeffrey et al. 2009a
Zintel Canyon, WA	0.43	Erickson et al. 2002a	0.05	Erickson et al. 2003b
Foote Creek Rim, WY	0.55	Johnson et al. 2000b	0.04	Young et al. 2003b
Buffalo Ridge, MN	0.33	Johnson et al. 2000a	0.03	Johnsonet al. 2000a
Combine Hills, OR	0.75	Young et al. 2003c	0	Young et al. 2006
Dry Lake, AZ	0.13	Thompson et al. 2011	0	Thompsonet al. 2011
Grand Ridge, IL	0.20	Derby et al. 2009	0	Derby et al. 2010b
Klondike, OR	0.50	Johnson et al. 2002	0	Johnson et al. 2003
Vansycle, OR	0.66	WCIA and WEST 1997	0	Erickson et al. 2000

Table 2. Regression method to predict golden eagle fatality at the Alta East Wind Resource Area.

Variables	Site-Specific Raptor and Eagle Use Data
Raptor use (birds/plot/20-min survey)	0.09
Predicted raptor fatality per MW (Less than 0.01)	0.01
Eagle use (birds/plot/20-min survey)	0.02
Proportion of eagle use to raptor use	0.222
Predicted eagle fatality per MW	0.0022
	Project-wide Risk based on Specific Turbine Model
Variables	**Vestas V90-3MW**
MW/turbine	3
Number of turbines	106
Total MW	318
Eagle fatalities per year	0.700

Approach 3: Risk Collision Modeling

The final method for estimating eagle mortality applies the modeling approach prescribed in the USFWS Draft Eagle Conservation Plan Guidance (USFWS 2011). Tables 3, 4, and 5 contain parameters used to calculate a model of collision risk. An avoidance rate of 99% was used in the model following Whitfield (2009), as well as a more conservative avoidance rate of 95%.

Table 3. Values of parameters used to generate an eagle fatality estimate for the Alta East Wind Resource Area.

Exposure Rate Calculations	Vestas V90-3MW
Eagle Use (birds/plot/20-minute survey)	0.02
Use Survey Plot Radius (m)	800
Average flight time of eagles observed during surveys (min)	3
Survey Length (min)	20
Exposure Rate (flight minutes/minutes surveyed/survey area km^2)	0.00149
# minutes daylight hours	262,800
# turbines	106
Total risk area around turbines (Danger Zone) (km^2)	3.33
Exposure within the Danger Zone (min)	**1,305.78**

Table 4. Input values and calculations for the probability of collision/min flight in danger zone.

Exposure Time in RSA or RSV	Vestas V90-3MW
Turbine Height (m)	175
Rotor Radius (m)	45.0
Area of Rotor Swept Zone (m^2)	6,361.73
Area of Risk Zone (m^2)	35,000
Proportion of flight minutes below turbine height	0.88
Exposure minutes in Rotor Swept Zone	**207.6765**

Table 5. Variables for Probability of Collision (Tucker 1996).

Model Variables	Vestas V90-3MW
# Blades per turbine	3
Rotor Radius	45.0
Rotor RPM (Maximum Operating Speed)	18.4
Rotor Angular Speed	1.93
Wind Velocity (Maximum Operating Speed)	15
Axial Induction Factor	0.25
Average Adult Bird Wingspan (m)	2.1
Length of Birds (m)	0.9
Bird Aspect Ratio	2.33
Bird Air Velocity (m/s)	14
Tangential Threshold Speed (m/s)	25
P(Collision)	0.055

Using this modeling approach for Vestas V90-3.0MW turbines, we estimate a fatality rate of 0.114 eagles per year (less than one golden eagle fatality every five years) at a 99% avoidance rate, and 0.569 eagles per year (three fatalities every five years) based on the more conservative 95% avoidance rate (Table 6).

Table 6. Predicted annual eagle mortality based on 99% and 95% avoidance rates at the Alta East Wind Resource Area using the USFWS (2011) modeling approach.

Mortality Variables	Vestas V90-3MW
Eagle fatalities per year w/ 99% avoidance rate	0.114
Eagle fatalities per year w/ 95% avoidance rate	0.569

CONCLUSIONS

The three approaches generate project-wide fatality estimates for golden eagles ranging from zero to 0.7 eagle fatalities/yr. Although some golden eagle fatalities may occur, based on the use data and prediction models currently available to assess risk, it appears that the number of fatalities would likely be small. Based on the variation in seasonal use of the AEWRA by golden eagles observed during two years of study, risk of mortality is expected to be highest during the winter.

While use estimates (i.e., abundance) have shown promise at predicting raptor fatalities in general, use alone may not be a good predictor of eagle mortality. High raptor and eagle mortalities at wind energy facilities have been attributable to multiple factors including: high eagle densities, high prey densities, high turbine densities, and wind turbine/tower design (Erickson et al. 2002b, Hunt 2002). Topographic features that may concentrate eagle activity, such as ridge tops, upwind sides of slopes, and canyons where eagles can take advantage of wind currents that are favorable for soaring, hunting and travelling, as well as for migratory flights, may also increase the risk of collisions with wind turbines (Curry and Kerlinger 1998, NWCC 2010).

The site-specific information collected to date and the golden eagle fatality predictions suggest that the AEWRA is reasonably likely to take eagles, but it is unclear if that take would be at a rate greater than is consistent with maintaining a stable or increasing population. It is unclear to what degree any eagle mortality at the AEWRA would adversely impact the local population due to lack of information on the population in the region, and a lack of understanding of what level of mortality, if any, could be sustained. At Altamont Pass, where eagle mortalities have been documented to be relatively high, few breeding-age eagles are killed. Most of the fatalities are sub-adults and floaters (non-breeding adult birds; Hunt 2002); however, even with these annual fatalities recorded over a 15-year period at the site, the regional population was estimated to be stable (Hunt 2002). Recent raptor nest surveys continue to show all territories near Altamont Pass to be occupied by breeding golden eagles (100% occupancy, Hunt and Hunt 2006). If there is a delayed impact on the nesting or floating population at Altamont Pass, it has not been documented in the 20 years that the wind energy facility has been in operation. Furthermore, it might be considered unlikely that the fatalities from Altamont Pass would affect any one local population, but over time the loss of sub-adult and non-breeding adults could lead to broader population level effects, even if undetectable in localized populations. Because golden eagles are a long-lived species with relatively low reproductive output, adult survival is likely a key driver in population stability; hence, the loss of non-breeders and sub-adults may not be evident for many years.

The predicted fatality rates for eagles associated with the AEWRA are extremely low in comparison to Altamont Pass, and although Tehachapi area eagles may be affected differently than those in Altamont Pass, the weight of evidence suggests that the small number of eagle fatalities anticipated for the AEWRA is unlikely to cause an unstable or declining population in the region.

REFERENCES

Chatfield, A., W.P. Erickson, and K. Bay. 2010. Wildlife Baseline Studies for the Sun Creek Wind Resource Area, Kern County, California. Final Report: May 2009 – May 2010. Prepared for CH2M HILL, Oakland, California. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Chatfield, A., W.P. Erickson, and K. Bay. 2011. Avian Baseline Studies for the Alta East Wind Resource Area, Kern County, California. Draft Final Report: July 10, 2010 – June 1, 2011. Prepared for CH2M HILL, Oakland, California. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Curry, R. C., and P. Kerlinger. 1998. Avian mitigation plan: Kinetic model wind turbines, Altamont Pass Wind Resources Area, California. Technical report by Curry and Kerlinger, LLC. McLean, Virginia, USA.

Derby, C., A. Dahl, K. Taylor, K. Bay, and K. Seginak. 2008. Wildlife Baseline Studies for the Wessington Springs Wind Resource Area, Jearald County, South Dakota, March 2007-November 2007. Technical report prepapred for Power Engineers, Inc. and Babcock and Brown Renewable Holdings, Inc. by Western EcoSystems Technology, Inc. (WEST).

Derby, C., K. Bay, and J. Ritzert. 2009. Bird Use Monitoring, Grand Ridge Wind Resource Area, La Salle County, Illinois. Year One Final Report, March 2008 - February 2009. Prepared for Grand Ridge Energy LLC, Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. July 29, 2009.

Derby, C., A. Dahl, A. Merrill, and K. Bay. 2010a. 2009 Post-Construction Monitoring Results for the Wessington Springs Wind-Energy Facility, South Dakota. Final Report. Prepared for Wessington Wind Energy Center, LLC, Juno Beach, Florida. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. August 19, 2010.

Derby, C., J. Ritzert, and K. Bay. 2010b. Bird and Bat Fatality Study, Grand Ridge Wind Resource Area, Lasalle County, Illinois. January 2009 - January 2010. Prepared for Grand Ridge Energy LLC, Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. July 13, 2010. Revised January 2011.

Enk, T., W.P. Erickson, K. Bay, M. Sonnenberg, J.R. Boehrs, and A. Palochak. 2011. In press. Post-Construction Avian Use Studies, Elkhorn Valley Wind Farm, Union County, Oregon: March 2010 – February 2011. Prepared for Horizon Wind Energy, Houston, Texas. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Enz, T. and K. Bay. 2010. Post-Construction Avian and Bat Fatality Monitoring Study, Tuolumne Wind Project, Klickitat County, Washington. Final Report: April 20, 2009 - April 7, 2010. Prepared for Turlock Irrigation District, Turlock, California. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. July 6, 2010.

Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2003a. Stateline Wind Project Wildlife Monitoring Annual Report, Results for the Period July 2001 - December 2002. Technical report submitted to FPL Energy, the Oregon Office of Energy, and the Stateline Technical Advisory Committee. Western EcoSystems Technology, Inc., Cheyenne, Wyoming. May 2003.

Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2004. Stateline Wind Project Wildlife Monitoring Final Report: July 2001 - December 2003. Technical report for and peer-reviewed by FPL Energy, Stateline Technical Advisory Committee, and the Oregon Energy Facility Siting Council, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Walla Walla, Washington, and Northwest Wildlife Consultants (NWC), Pendleton, Oregon. December 2004. http://www.west-inc.com

Erickson, W.P., J. Jeffrey, and V.K. Poulton. 2008. Avian and Bat Monitoring: Year 1 Report. Puget Sound Energy Wild Horse Wind Project, Kittitas County, Washington. Prepared for Puget Sound Energy, Ellensburg, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. January 2008.

Erickson, W.P., G.D. Johnson, M.D. Strickland, and K. Kronner. 2000. Avian and Bat Mortality Associated with the Vansycle Wind Project, Umatilla County, Oregon: 1999 Study Year. Technical report prepared by WEST, Inc. for Umatilla County Department of Resource Services and Development, Pendleton, Oregon. 21pp. http://www.west-inc.com/reports/vansyclereportnet.pdf

Erickson, W.P., G.D. Johnson, K. Bay, and K. Kronner. 2002a. Ecological Baseline Study for the Zintel Canyon Wind Project. Final Report April 2001 – June 2002. Technical report prepared for Energy Northwest. Prepared for Energy Northwest by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. June 2002.

Erickson, W.P., G.D. Johnson, D.P. Young, Jr., D. Strickland, R. Good, M. Bourassa, K. Bay, and K. Sernka. 2002b. Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments. Technical report prepared for Bonneville Power Administration, Portland, Oregon by WEST, Inc., Cheyenne, Wyoming. December 2002. http://www.bpa.gov/Power/pgc/wind/Avian_and_Bat_Study_12-2002.pdf

Erickson, W.P., K. Kronner, and B. Gritski. 2003b. Nine Canyon Wind Power Project Avian and Bat Monitoring Report. September 2002 – August 2003. Prepared for the Nine Canyon Technical Advisory Committee and Energy Northwest by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants (NWC), Pendleton, Oregon. October 2003. http://www.west-inc.com/reports/nine_canyon_monitoring_final.pdf

Erickson, W.P., E. Lack, M. Bourassa, K. Sernka, and K. Kronner. 2001. Wildlife Baseline Study for the Nine Canyon Wind Project, Final Report May 2000-October 2001 Technical report prepared for Energy Northwest, Richland, Washington.

Erickson, W.P., D.P. Young, G. Johnson, J. Jeffrey, K. Bay, R. Good, and H. Sawyer. 2003c. Wildlife Baseline Study for the Wild Horse Wind Project. Summary of Results from 2002-2003 Wildlife Surveys May 10, 2002- May 22, 2003. Draft report prepared for Zilkha Renewable Energy, Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. November 2003.

Gritski, B., K. Kronner, and S. Downes. 2008. Leaning Juniper Wind Power Project, 2006 – 2008. Wildlife Monitoring Final Report. Prepared for PacifiCorp Energy, Portland, Oregon. Prepared by Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. December 30, 2008.

Hunt, W.G. 2002. Golden Eagles in a Perilous Landscape: Predicting the Effects of Mitigation for Wind Turbine Bladestrike Mortality. California Energy Commission (CEC) Consultant Report P500-02-043F, CEC Sacramento, California. July 2002. Prepared for CEC, Public Interest Energy Research (PIER), Sacramento, California, by University of California, Santa Cruz, California. http://www.energy.ca.gov/reports/2002-11-04_500-02-043F.PDF

Hunt, G. and T. Hunt. 2006. The Trend of Golden Eagle Territory Occupancy in the Vicinity of the Altamont Pass Wind Resource Area: 2005 Survey. Public Interest Energy Research Program (PIER) Final Project Report, CEC-500-2006-056. 17 pp. http://www.energy.ca.gov/2006publications/CEC-500-2006-056/CEC-500-2006-056.PDF.

Jeffrey, J.D., K. Bay, W.P. Erickson, M. Sonneberg, J. Baker, M. Kesterke, J.R. Boehrs, and A. Palochak. 2009a. Portland General Electric Biglow Canyon Wind Farm Phase I Post-Construction Avian and Bat Monitoring First Annual Report, Sherman County, Oregon. January 2008 - December 2008. Technical report prepared for Portland General Electric Company, Portland, Oregon. Prepared by Western EcoSystems Technology (WEST) Inc., Cheyenne, Wyoming, and Walla Walla, Washington. April 29, 2009.

Jeffrey, J.D., W.P. Erickson, K. Bay, M. Sonneberg, J. Baker, J.R. Boehrs, and A. Palochak. 2009b. Horizon Wind Energy, Elkhorn Valley Wind Project, Post-Construction Avian and Bat Monitoring, First Annual Report, January-December 2008. Technical report prepared for Telocaset Wind Power Partners, a subsidiary of Horizon Wind Energy, Portland, Oregon. Prepared by Western EcoSystems Technology, Inc., Cheyenne, Wyoming, and Walla Walla, Washington. May 4, 2009.

Johnson, G.D. 2004. Analysis of Potential Wildlife and Habitat Impacts from the Klondike II Project, Sherman County, Oregon. Technical report prepared by WEST, Inc., for CH2MHILL and PPM Energy.

Johnson, G.D. and W.P. Erickson. 2004. Analysis of Potential Wildlife/Wind Plant Interactions, Bighorn Site, Klickitat County, Washington. Prepared for CH2MHILL, Portland, Oregon by WEST, Inc., Cheyenne, Wyoming. August 2004.

Johnson, G.D., W.P. Erickson, K. Bay, and K. Kronner. 2002. Baseline Ecological Studies for the Klondike Wind Project, Sherman County, Oregon. Final report prepared for Northwestern Wind Power, Goldendale, Washington, by Western EcoSystems Technology, Inc. (WEST) Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. May 29, 2002.

Johnson, G.D., W.P. Erickson, and J.D. Jeffrey. 2006. Analysis of Potential Wildlife Impacts from the Windy Point Wind Energy Project, Klickitat County, Washington. Unpublished report prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. February 3, 2006.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, and D.A. Shepherd. 2000a. Avian Monitoring Studies at the Buffalo Ridge Wind Resource Area, Minnesota: Results of a 4-Year Study. Final report prepared for Northern States Power Company, Minneapolis, Minnesota, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. September 22, 2000. 212 pp. http://www.west-inc.com

Johnson, G.D., W.P. Erickson, and J. White. 2003. Avian and Bat Mortality During the First Year of Operation at the Klondike Phase I Wind Project, Sherman County, Oregon. Technical report prepared for Northwestern Wind Power, Goldendale, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. March 2003. http://www.west-inc.com

Johnson, G.D., D.P. Young, W.P. Erickson, C.E. Derby, M.D. Strickland, and R.E. Good. 2000b. Wildlife Monitoring Studies, Seawest Windpower Plant, Carbon County, Wyoming, 1995-1999. Final report prepared for SeaWest Energy Corporation, San Diego, California, and the Bureau of Land Management, Rawlins, Wyoming, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. August 9, 2000. http://www.west-inc.com/reports/fcr_final_baseline.pdf

Kerlinger, P., L. Culp, and R. Curry. 2005. Post-Construction Avian Monitoring Study for the High Winds Wind Power Project, Solano County, California. Year One Report. Prepared for High Winds, LLC and FPL Energy.

Kerlinger, P., R. Curry, L. Culp, A. Jain, C. Wilkerson, B. Fischer, and A. Hasch. 2006. Post-Construction Avian and Bat Fatality Monitoring for the High Winds Wind Power Project, Solano County, California: Two Year Report. Prepared for High Winds LLC, FPL Energy by Curry and Kerlinger, LLC. April 2006.

Kronner, K., R. Gritski, J. Baker, V. Marr, G. Johnson, and K. Bay. 2005. Wildlife Baseline Study for the Leaning Juniper Wind Power Project, Gilliam County, Oregon. Northwest Wildlife Consultants, Inc., Western Ecosystems Technology, Inc., Prepared for PPM Energy, Portland, Oregon and CH2MHILL, Portland, Oregon by NWC, Pendleton, Oregon, and WEST, Inc., Cheyenne, Wyoming. November 3, 2005.

Kronner, K., R. Gritski, and S. Downes. 2008. Big Horn Wind Power Project Wildlife Fatality Monitoring Study: 2006–2007. Final report prepared for PPM Energy and the Big Horn Wind Project Technical Advisory Committee by Northwest Wildlife Consultants, Inc. (NWC), Mid-Columbia Field Office, Goldendale, Washington. June 1, 2008.

Kronner, K., R. Gritski, Z. Ruhlen, and T. Ruhlen. 2007. Leaning Juniper Phase I Wind Power Project, 2006-2007: Wildlife Monitoring Annual Report. Unpublished report prepared by Northwest Wildlife Consultants, Inc. for PacifiCorp Energy, Portland, Oregon.

National Wind Coordinating Collaborative (NWCC). 2010. Wind Turbine Interactions with Birds, Bats, and Their Habitats: A Summary of Research Results and Priority Questions. NWCC c/o RESOLVE, Washington, D.C. Available online at: http://www.nationalwind.org//publications/bbfactsheet.aspx

Northwest Wildlife Consultants, Inc. (NWC) and Western EcoSystems Technology, Inc. (WEST). 2007. Avian and Bat Monitoring Report for the Klondike II Wind Power Project. Sherman County, Oregon. Prepared for PPM Energy, Portland, Oregon. Managed and conducted by NWC, Pendleton, Oregon. Analysis conducted by WEST, Cheyenne, Wyoming. July 17, 2007.

Reynolds, R.T., J.M. Scott, and R.A. Nussbaum. 1980. A Variable Circular-Plot Method for Estimating Bird Numbers. Condor 82(3): 309-313.

Taylor, K., J. Gruver, and K. Bay. 2008. Wildlife Studies for the Campbell Hill Wind Resource Area, Converse County, Wyoming. Fall Summary Report: September 9 - November 5, 2008. Prepared for Three Buttes Windpower, LLC/Duke Energy. Prepared by Western EcoSystems Technology, Inc.(WEST), Cheyenne, Wyoming. December 30, 2008.

Taylor, K., T. Rintz, and K. Bay. 2011. In Press. Year 1 Post-Construction Monitoring for the Campbell Hill Windpower Project, Converse County, Wyoming. Final Report: February 2010 – January 2011. Prepared for Duke Energy. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Thompson, J., D. Solick, and K. Bay. 2011. Post-Construction Fatality Surveys for the Dry Lake Phase I Wind Project. Iberdrola Renewables: September 2009 - November 2010. Prepared for Iberdrola Renewables, Portland, Oregon. Prepared by Western Ecosystems Technology, Inc. (WEST), Cheyenne, Wyoming. February 10, 2011.

Tucker, V.A. 1996. Using a Collision Model to Design Safer Wind Turbine Rotors for Birds. Transcripts of the ASME Journal of Solar Energy Engineering 118: 263-269.

US Fish and Wildlife Service (USFWS). 2011. Draft Eagle Conservation Plan Guidance. January 2011. Available online at: http://www.fws.gov/windenergy /docs/ECP_draft_guidance_2_10_final_clean_omb.pdf

Western EcoSystems Technology, Inc. (WEST). 2005a. Exhibit A: Ecological Baseline Study at the Elkhorn Wind Power Project. Draft final report prepared for Zilkha Renewable Energy, LLC, Portland, Oregon, by WEST, Cheyenne, Wyoming. June 2005.

Western EcoSystems Technology, Inc. (WEST). 2005b. Wildlife and Habitat Baseline Study for the Proposed Biglow Canyon Wind Power Project, Sherman County, Oregon. March 2004 - August 2005. Prepared for Orion Energy LLC., Oakland, California. WEST, Cheyenne, Wyoming. October, 2005.

Western EcoSystems Technology, Inc. (WEST). 2006. Diablo Winds Wildlife Monitoring Progress Report, March 2005 - February 2006. Technical report submitted to FPL Energy and Alameda County California. WEST. Cheyenne, Wyoming.

Western EcoSystems Technology, Inc. (WEST). 2008. Diablo Winds Wildlife Monitoring Progress Report: March 2005 – February 2007. Prepared by WEST, Cheyenne, Wyoming. August 2008.

Whitfield, D.P. 2009. Collision Avoidance of Golden Eagle at Wind Farms under the 'Band' Collision Risk Model. Report to Scottish Natural Heritage. Natural Research Ltd, Banchory, UK. March 2009.

Woodward-Clyde International-Americas, (WCIA) and Western EcoSystems Technology, Inc. (WEST). 1997. Avian Baseline Study for the Vansycle Ridge Project - Vansycle Ridge, Oregon and Wildlife Mortality Studies, Vansycle Wind Project, Washington. Prepared for Esi Vansycle Partners, L.P., North Palm Beach, Florida.

Young, D.P. Jr., W.P. Erickson, K. Bay, J. Jeffrey, E.G. Lack, R.E. Good, and H.H. Sawyer. 2003a. Baseline Avian Studies for the Proposed Hopkins Ridge Wind Project, Columbia County, Washington. Final Report, March 2002 - March 2003. Prepared for RES North America, LLC., Portland, Oregon, by Western EcoSystems Technology, Inc.(WEST), Cheyenne, Wyoming. April 30, 2003.

Young, D.P. Jr., W.P. Erickson, R.E. Good, M.D. Strickland, and J.P. Eddy. 2003b. Avian and Bat Mortality Associated with the Initial Phase of the Foote Creek Rim Windpower Project, Carbon County, Wyoming: November 1998 - June 2002. Technical report prepared for the SeaWest Energy Corporation, San Diego, California, and the Bureau of Land Management, Rawlins, Wyoming, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. http://www.west-inc.com/

Young, D.P. Jr., W.P. Erickson, J. Jeffrey, K. Bay, and M. Bourassa. 2003c. Avian and Sensitive Species, Baseline Study Plan and Final Report, Eurus Combine Hills Turbine Ranch, Umatilla County, Oregon. Technical report for Eurus Energy America Corporation and Aeropower Services, Inc. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Young, D.P. Jr., W.P. Erickson, J. Jeffrey, and V.K. Poulton. 2007. Puget Sound Energy Hopkins Ridge Wind Project Phase 1 Post-Construction Avian and Bat Monitoring First Annual Report, January - December 2006. Technical report for Puget Sound Energy, Dayton, Washington and Hopkins Ridge Wind Project Technical Advisory Committee, Columbia County, Washington. Western EcoSystems Technology, Inc. (WEST) Cheyenne, Wyoming, and Walla Walla, Washington. 25 pp.

Young, D.P. Jr., J. Jeffrey, W.P. Erickson, K. Bay, and V.K. Poulton. 2006. Eurus Combine Hills Turbine Ranch. Phase 1 Post Construction Wildlife Monitoring First Annual Report. Technical report prepared for Eurus Energy America Corporation, San Diego, California, and the Combine Hills Technical Advisory Committee, Umatilla County, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon.

Appendix D-31

Small Mammal Trapping Results

December 2011

Appendix D-31

Small Mammal Trapping Results
December 2011

Appendix D-23

Small Mammal Trapping Results

December 2007

SMALL MAMMAL TRAPPING RESULTS FOR THE Alta East WIND ENERGY PROJECT

KERN COUNTY, CALIFORNIA

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December 2011

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Table

1 Total Number of Captures per Species per Grid

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A California Department of Fish and Game Mohave Ground Trapping Protocol
B Daily results and habitat description of grids
C Photographs of habitat at each trapping grid

1 Introduction

Alta Windpower Development, LLC proposes to construct the Alta East Wind Project (project) in the Tehachapi region of southern California. Portions of the project would be located on land managed by the U.S. Bureau of Land Management and privately owned land under the jurisdiction of Kern County. William Vanherweg was contracted by CH2M HILL Engineers, Inc. (CH2M HILL) to conduct surveys for Mohave ground squirrel (*Xerospermophilus mohavensis*) and other special-status small mammals.

1.1 Project Description

The proposed development is a wind energy facility with a nameplate capacity rating of approximately 318 megawatts of wind turbine generation and includes ancillary facilities and supporting infrastructure. Up to 106 wind turbine generators would be installed. The project includes repowering a historical wind power project site north of State Route (SR) 58 on BLM lands and infilling existing wind facilities south of SR 58 in the area of Cameron Ridge. The project is located 2 miles west of the intersection of SR 58 and SR 14 in the Mojave Desert (Figure 1) and is within the Tehachapi Wind Resource Area (WRA) of eastern Kern County.

2 Environmental Setting

The project area falls within the Mojave Basin and Range ecoregion. This ecoregion is characterized by scattered, generally low-elevation mountains. Much of the land in this ecoregion is federally owned. Some areas have experienced severe wind and water erosion problems have been linked to extensive off highway vehicle (OHV) use, overgrazing and fire (USEPA, 2009). The climate in this ecoregion consists of the Mediterranean climate of hot, dry summers and moist, cool winters.

The elevation of the site ranges from approximately 3,000 to 4,400 feet above sea level.

2.1 Current Land Use

The project site exhibits light to heavy disturbance. Human disturbance influencing the project area includes: OHV use, urban/industrial development, scattered trash, and SR 58.

2.2 Vegetation

The project site is predominantly creosote bush (*Larrea tridentata*) scrub habitat with some Joshua tree woodland and mixed Mojave scrub.





LEGEND

Project Area

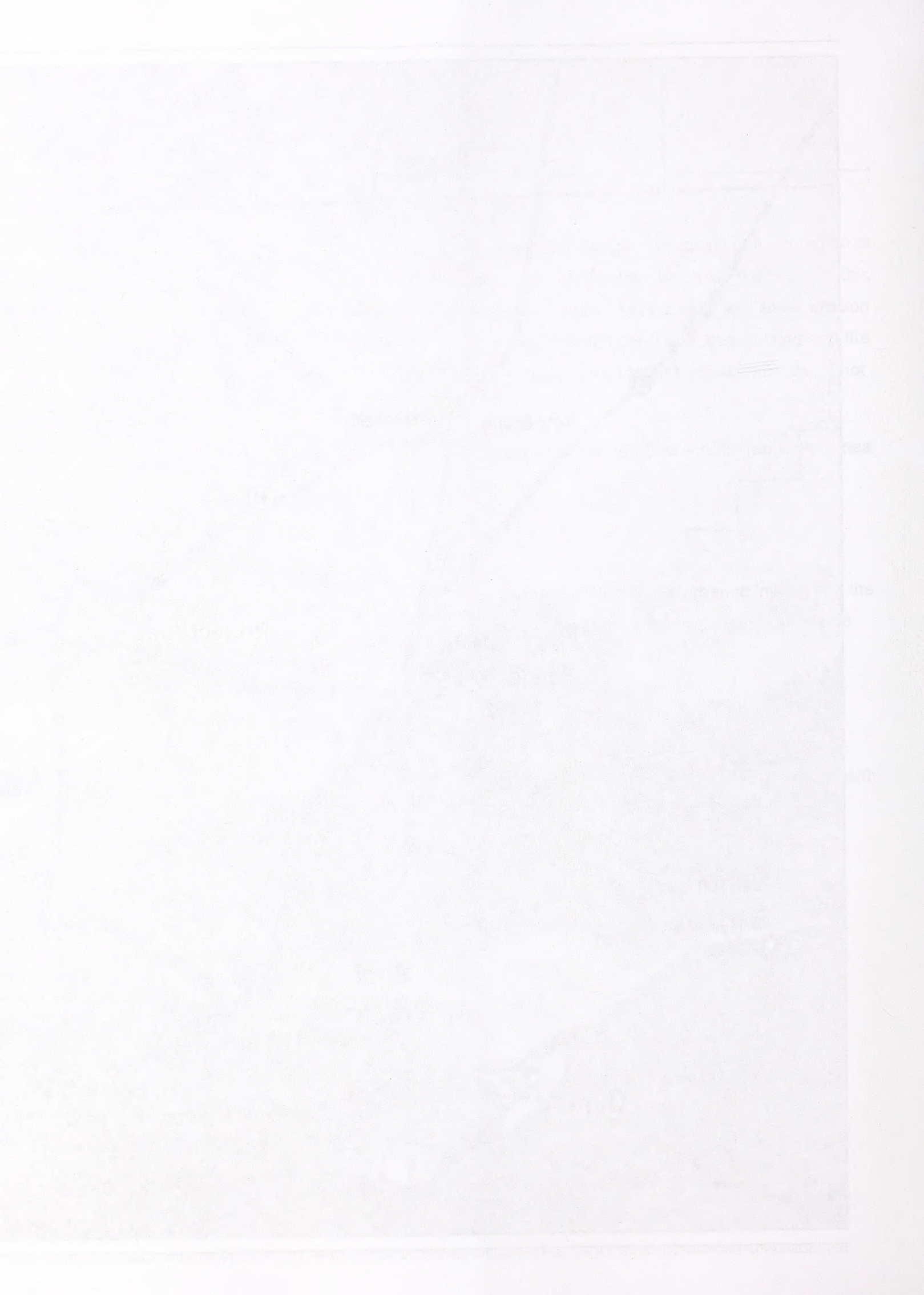
N

0 7.5 15
Miles

FIGURE 1
Project Vicinity Map
Alta East Wind Project
Alta Wind Energy Center Project

CH2MHILL

DEN \\COBRA\PROJ\TERRAGENPOWER\TERRAGEN_ALTA_EAST\GIS\MAPFILES\BIOLOGICAL_ASSESSMENT\BA_FIG1_PROJECTVICINITY.MXD SSAVAGE1 6/2/2011 3:22:04 PM



3 Special Status Mammals Natural History

A California Natural Diversity Database (CNDDB) search was conducted for the project area and a ten mile buffer May 27, 2011. The following special-status small mammals were present in the CNDDB search area: Mohave ground squirrel, San Joaquin pocket mouse (*Perognathus inornatus*), and Tehachapi pocket mouse (*Perognathus alticola*), and Tulare grasshopper mouse (*Onychomys torridus tularensis)*. Based on a review of species' ranges for subspecies that appear in the database search, Tulare grasshopper mouse does not occur in the project area (Hall 1981). Tulare grasshopper mice are known only from west of the project site in the San Joaquin Valley and the Carrizo Plain. The subspecies that occurs in the project area is *O. t. pulcher* and is not considered a special status taxon (Hall 1981). Therefore, Tulare grasshopper mouse was not included in this investigation. This report addresses trapping for Mohave ground squirrel, San Joaquin pocket mouse, and Tehachapi pocket mouse.

3.1 Mohave Ground Squirrel

Mohave ground squirrels are approximately 8.5 - 9 inches in length and can be found in desert scrub habitats. Activity periods for this species vary and little is known about their reproduction (Ingles 1979). Their diet consists of seeds, vegetative parts of desert plants including fruits of the Joshua tree. Due to the aridity and high temperatures of its environment they are a diurnal species spending up to seven months underground. The Mohave ground squirrel is listed as threatened by the California Department of Fish and Game (CDFG). In October 2011, the U.S. Fish and Wildlife Service determined that listing of the Mohave ground squirrel under the federal Endangered Species Act is not warranted at this time. (76 Fed. Reg. 622144).

3.2 San Joaquin Pocket Mouse

The San Joaquin pocket mouse is relatively small with adults weighing 12-18 grams. Their pelage is light brown to cinnamon with white bellies. They are nocturnal and are rarely active when temperatures drop below 50° Fahrenheit. They mainly eat small seeds of grasses and forbs but have been known to eat cutworms (Best 1993). The species is generally associated with annual grassland and oak habitat (Laabs and Allaback 2002), but has also been captured in all desert scrub habitats, Joshua tree woodland, juniper woodland, and other higher elevation scrub habitats (Vanherweg personal experience). The San Joaquin pocket mouse is a state species of special concern, which does not confer any legal protections, but rather calls attention to a species that may be listed at some time in the future. Recent work by David Laabs and Mark Allaback indicate that the San Joaquin pocket mice found in the Tehachapi Mountains and western Mojave Desert, which includes the project area, are most likely a new taxon, the Mohave pocket mouse (*Perognathus* sp.).

3.3 Tehachapi Pocket Mouse

The Tehachapi pocket mouse is medium-sized for the genus, averaging (5.9 and 6.5 in.) in total length and 16-28 grams for females and males, respectively (Best, 1994). Little is known about the ecology of the Tehachapi pocket mouse. Other members of the genus are nocturnal granivores, foraging primarily on seeds of grasses, forbs and annuals, but also on leafy plant material and insects (Verts and Kirkland, 1988). Most other members of the genus exhibit seasonal hibernation (Verts and Kirkland, 1988). The Tehachapi pocket mouse occupies native and non-native grasslands, Joshua tree woodland, pinyon-juniper woodland, yellow pine woodland and oak savannah (Williams et al., 1993). It constructs burrows in loose, sandy soils. The Tehachapi pocket mouse is a state species of special concern, which does not confer any legal protections, but rather calls attention to a species that may be listed at some time in the future.

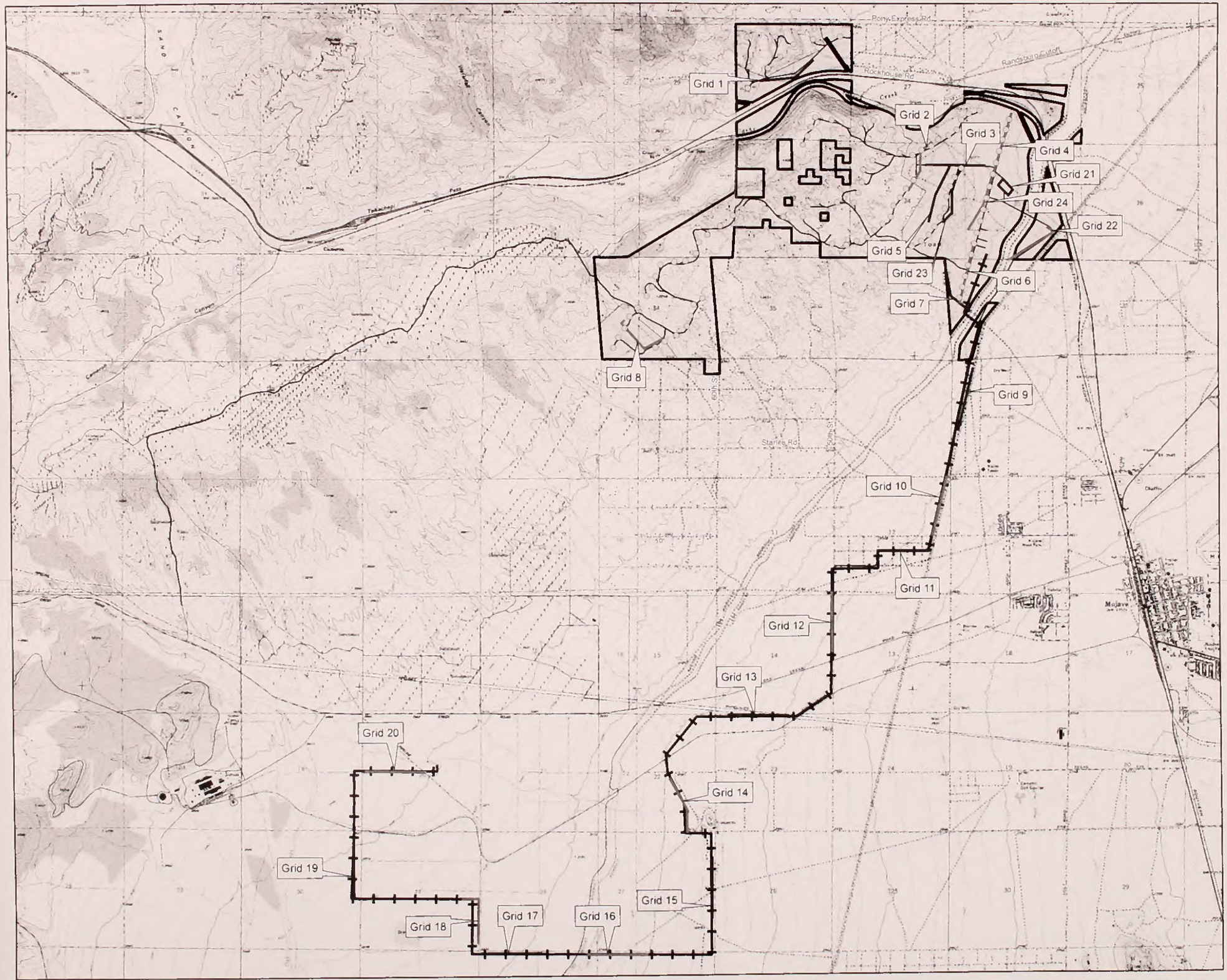
4 Methods

4.1 Mohave Ground Squirrel

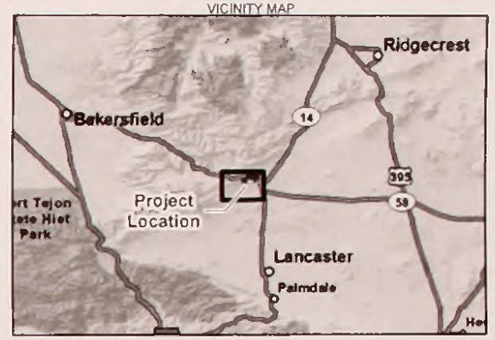
Surveys for Mohave ground squirrels were consistent with the survey guidelines issued by CDFG (CDFG, 2003) (Appendix A). An evaluation of habitat suitability was conducted in June 2010 (Vanherweg 2010). In spring 2011, a map displaying suitable habitat and proposed trapping grids was submitted to Justin Sloan at CDFG for review. Twenty-four trapping grids were established along linear portions of the project including proposed turbine strings, transmission lines, access roads, and at a laydown area (Figure 2). The trapping grids along the proposed linear developments were arranged in 4 x 25 trap configurations, the laydown area had a 10 x 10 configuration, as per CDFG protocol. The first session of trapping was conducted between 15 March and 30 April, the second session between 1 and 31 May, and the third between 15 June and 15 July, per the CDFG protocol.

4.2 Other Special-status Small Mammals

Nocturnal trapping for Tehachapi pocket mouse and San Joaquin pocket mouse in appropriate habitats of the proposed project area (Figure 2) was conducted during May in some locations and August 2011 in others. We trapped one grid for each two miles of linear corridor and for each 160 acres of nonlinear project area. This level of trapping intensity is consistent with CDFG protocol for listed nocturnal small mammal species in the San Joaquin Valley.



VICINITY MAP



LEGEND

- Proposed Wind Turbine Layout
- Proposed Access Roads
- Transmission Line
- Mohave Ground Squirrel Potential Habitat Area within the Project Boundary

Mohave Ground Squirrel Trapping Grid Line

- Grids 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21 & 23
- Grids 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22 & 24
- Alta East Wind Energy Project Area

Notes:
Trapping Grid lines were grouped by color for visual clarity only and do not represent any differences in method or approach.

N

0 2,000 4,000
Feet

FIGURE 2
Mohave Ground Squirrel Trapping Grids
Alta East Wind Energy Project
Kern County, California

CH2MHILL

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5 Results

No Mohave ground squirrels were captured during the three sessions of trapping. San Joaquin pocket mouse was captured during our diurnal trapping surveys. We captured one San Joaquin pocket mouse on grid 21 during our nocturnal trapping surveys. Table 1 contains the general results of the Mojave ground squirrel trapping survey. Habitat descriptions of each grid, daily weather conditions, and results of our diurnal and nocturnal trapping efforts can be found in Appendix B. Appendix C contains photographs of each grid.

Table 1. Total Number of Diurnal Captures per Species per Grid.

Total Captures Per Grid Per Species			
Grid	Mohave ground squirrel	White-tailed antelope squirrel	California ground squirrel
1	0	142	1
2	0	162	0
3	0	164	5
4	0	201	13
5	0	223	0
6	0	36	0
7	0	25	0
8	0	1	0
9	0	23	0
10	0	33	0
11	0	22	0
12	0	15	0
13	0	5	0
14	0	41	0

15	0	46	0
16	0	68	0
17	0	52	0
18	0	17	0
19	0	22	0
20	0	30	5
21	0	118	11
22	0	33	0
23	0	215	2
24	0	50	4

6 References

Bailey, V., and C.C. Sperry. 1929. Life history and habits of the grasshopper mice, genus *Onychomys*. U.S. Dept. Agric. Tech. Bull. 145:1-19.

Best, T.L. 1993. *Perognathus inornatus*. Mammalian Species 450:1-5. The American Society of Mammalogists.

Best, T.L. 1994. *Perognathus alticolus*. Mammalian Species 463:1-4. California Natural Diversity Data Base (CNDDB).

Bolster, B.C. Ed. 1998. Terrestrial Mammal Species of Special Concern in California.

Burt, W. B. and R. P. Grossenheimer. 1976. A field guide to the mammals. Houghton Mifflin Co. Boston, MA 289 pp.

California Department of Fish and Game. 2003. CDFG unpubl. guidelines. Mohave Ground Squirrel Survey Guidelines.

California Department of Fish and Game. 2010. California Natural Diversity Data Base Records.

Hall, E. R.1981. The Mammals of North America. 2d ed. 2 vols. New York: John Wiley & Sons.

Horner, B.E., J.M. Taylor, and H.A. Padykula. 1964. Food habits and gastric morphology of the grasshopper mouse. J. Mammal. 45:513-535.

Ingles, Lloyd G. 1979. Mammals of the Pacific States. Stanford University Press, Stanford, CA. 506pp.

Laabs, D.M.and M.L. Allaback 2002. *In* Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands. Vollmar Consulting, Berkeley, CA. in Vollmar, J.E. (Ed.). pp. 315-336.

McCarty, R. 1975. *Onychomys torridus*. Mammal. Species 59:1-5.

Vanherweg, W. 2010. Sun Creek Sensitive Mammals Habitat Suitability Survey. Memo. Submitted to CH2M HILL. June 17.

Verts, B.J, and G.L. Kirkland. 1988. *Perognathus parvus*. Mammalian Species 318: 1-8.

United States Environmental Protection Agency (USEPA). 2009. "Primary Distinguishing Characteristics of Level III Ecoregions of the Continental United States." [online]: http://www.epa.gov/wed/pages/ecoregions/level_iii.htm.

Williams, D.F., H.H. Genoways, and J.K. Braun. 1993. Taxonomy. pp. 36-196. *In:* H.H. Genoways and J.H. Brown (eds.), Biology of the Heteromyidae. Special Publication, The American Society of Mammalogists.

Appendix A – CDFG Mohave Ground Squirrel Trapping Protocol

CALIFORNIA DEPARTMENT OF FISH AND GAME
MOHAVE GROUND SQUIRREL SURVEY GUIDELINES
(January 2003)

1. Visual surveys to determine Mohave ground squirrel activity and habitat quality shall be undertaken the period of 15 March through 15 April. All potential habitat on a project site shall be visually surveyed during daylight hours by a biologist who can readily identify the Mohave ground squirrel and the white-tailed antelope squirrel (*Ammospermophilus leucurus*).

2. If visual surveys do not reveal presence of the Mohave ground squirrel on the project site, standard small-mammal trapping grids shall be established in potential Mohave ground squirrel habitat. The number of grids will depend on the amount of potential habitat on the project site, as determined by the guidelines presented in paragraphs 4 and 5 of these guidelines.

3. For linear projects (for example, highways, pipelines, or electric transmission lines), each sampling grid shall consist of 100 Sherman live-traps (or equivalent; the minimum length of any trap is 12 inches) arranged in a rectangular pattern, 4 traps wide by 25 traps long, with traps spaced 35 meters apart along each of the four trap lines. At a minimum, one sampling grid of this type shall be established in each linear mile, or fraction thereof, of potential Mohave ground squirrel habitat along the project corridor.

4. For all other types of projects, one sampling grid consisting of 100 Sherman live-traps (or equivalent; the minimum length of any trap is 12 inches) shall be established for each 80 acres, or fraction thereof, of potential Mohave ground squirrel habitat on the project site. The traps shall be arranged in a 10 x 10 grid, with 35-meter spacing between traps.

5. Each sampling grid shall be trapped for a minimum five consecutive days, unless a Mohave ground squirrel is captured before the end of the five-day term on the grid or on another grid on the project site. If no Mohave ground squirrel is captured on a sampling grid on the project site in the first five-consecutive-day term, each sampling grid shall be sampled for a SECOND five-consecutive-day term. Trapping may be stopped before the end of the second term if a Mohave ground squirrel is captured on any sampling grid on the project site. If no Mohave ground squirrel is captured during the second five-consecutive-day term, each sampling grid shall be sampled for a THIRD five-consecutive -day term. The FIRST trapping term shall begin and be completed in the period of 15 March through 30 April. If a SECOND term is required, it shall begin at least two weeks after the end of the first term, but shall begin no earlier than 01 May, and shall be completed by 31 May. If a THIRD term is required, it shall begin at least two weeks after the end of the second term, but shall begin no earlier than 15 June, and shall be completed by 15 July. All trapping shall be conducted during appropriate weather conditions, avoiding periods of high wind, precipitation, and low temperatures (<50°F or 10°C).

6. For projects requiring two or more sampling grids, capture of a Mohave ground squirrel on any grid will establish presence of the species on the project site. Trapping may be stopped on all grids on the project site at that time. For linear projects, very large project sites, project sites characterized by fragmented or highly-

heterogeneous habitats, or in other special circumstances, continued trapping may be necessary.

7. A maximum 100 traps shall be operated by each qualified biologist. Each trap shall be covered with a cardboard A-frame or equivalent non-metal shelter to provide shade. Trap and shelter orientation shall be on a north-south axis. All traps shall be opened within one hour of sunrise and may be closed beginning one hour before sunset. Traps shall be checked at least once every four hours to minimize heat stress to captured animals. When traps are open, temperature shall be measured at a location within the sampling grid, in the shade, and one foot (approx. 0.3 meters) above the ground at least once every hour. Traps shall be closed when the ambient air temperature at one foot above the ground in the shade exceeds 90°F (32°C). Trapping shall resume on the same day after the ambient temperature at one foot (approx. 0.3 meters) above the ground in the shade falls to 90°F (32°C) and shall continue until one hour before sunset. Suggested baits are mixed grains, rolled oats, or bird seed, with a small amount of peanut butter.

8. A qualified biologist shall complete the Survey and Trapping Form, which is found on page 5 of these guidelines. This biologist, or the lead agency for the project, shall submit the completed form to the appropriate Department office (see page 4) with the biological report on the project site.

9. The Department may allow variation on these guidelines, with the advance written approval of the appropriate regional habitat conservation planning office (see page 4). Such variations could include biologically-appropriate modification of the trapping dates or changes in grid configuration that would enhance the probability of detecting Mohave ground squirrels. Any variation which concerns trapping or marking methods must be incorporated into the MOU or permit that authorizes the work.

10. If a survey conducted according to these guidelines results in no capture or observation of the Mohave ground squirrel on a project site, this is not necessarily evidence that the Mohave ground squirrel does not exist on the site or that the site is not actual or potential habitat of the species. However, in the circumstance of such a negative result, the Department will stipulate that the project site harbors no Mohave ground squirrels. This stipulation will expire one year from the ending date of the last trapping on the project site conducted according to these guidelines.

Appendix B – Trapping Grid Habitat Descriptions, Daily Weather Conditions, and Trapping Results

Grid 1

Visual Surveys were conducted by: Greg Warrick

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS –*Bromus tectorum, Bromus madritensis., Erodium cicutarium, Amsinckia sp.*

DOMINANT PERENNIALS-, *Yucca brevifolia, Ephedra trifurca, Eriogonum fasciculatum, Ericameria sp., Achnatherum* sp., *Poa sp., Hymenoclea salsola,*

OTHER PERENNIALS- Juniperus californicus, *Tetradymia spinosa, Encelia farinosa, Grayia spinosa, Krashnekovia lanata, Lycium andersonii, Yucca sp., Opuntia sp., Lepidospartum squamatum, Larrea tridentata.*

Elevation – Approx. 3,500 to 3,600 ft **Slope –** 0% - 5%

Trapping conducted by: Greg Warrick

Grid 1

First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS*	MGS*	AM	PM	AM	PM
4/11/2011	0638	42	0	0	90%	30%	5-10	10-15
	1514	65						
4/12/2011	0710	52	4	0	40%	CLEAR	10-15	10-15
	1500	71						
4/13/2011	0701	48	2	0	10%	20%	10-15	25-30
	1507	46						
4/14/2011	0639	42	1	0	CLEAR	5%	5-10	5-10
	1439	67						
4/15/2011	0643	49	3	0	5%	1%	0-5	5-10
	1457	72						

Second Sampling Term

5/24/2011	0600	51	11	0	5%	CLEAR	10-15	10-15
	1407	75						
5/25/2011	0603	58	18	0	CLEAR	CLEAR	15-20	20
	1606	77						
5/26/2011	0620	49	9	0	15%	10%	25-30	30-35
	1459	61						
5/27//2011	0612	55	13	0	CLEAR	1%	35-40	15-20
	1549	69						
5/28/2011	0630	53	11	0	15%	5%	35-40	20-25
	1445	65						

Third Sampling Term

7/05/2011	0609	69	5	0	5 %	30 %	5-10	5-10
	1028	90+						
7/06/2011	0620	71	24	0	10 %	10 %	0-5	0-5
	1026	90+						
7/07/2011	0602	79	18	0	80 %	30 %	0-5	5-10
	1114	90+						
7/08/2011	0609	80	11	0	40 %	20 %	10-15	5-10
	0915	90+						
7/09/2011	0603	78	12	0	CLEAR	CLEAR	10-15	10-15
	0937	90+						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel, **1 California ground squirrel captured 7/7/2011

Nocturnal Results – Totals

Peromyscus maniculatus – 70, *Peromyscus truei* – 4, *Dipodomys panamintinus* – 8, *Neotoma lepida* – 2, *Onchomys torridus* – 5, *Chaetodiuis californicus- 5*

Grids 2-5

Visual Surveys were conducted by: William Vanherweg

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS –*Bromus tectorum, Bromus madritensis., Erodium cicutarium, Amsinckia sp.*

DOMINANT PERENNIALS-, *Larrea tridentata Yucca brevifolia, Ephedra trifurca, Eriogonum fasciculatum, Ericameria* sp., *Achnatherum* sp., *Poa* sp., *Hymenoclea salsola,*

OTHER PERENNIALS- *Juniperus californicus*, *Tetradymia spinosa, Encelia farinosa, Grayia spinosa, Krascheninnikovia lanata, Lycium andersonii, Yucca* sp., *Opuntia* sp., *Lepidospartum squamatum.*

Elevation – Approx. 3,200 to 3,300 ft **Slope** – 0% - 5%

Trapping conducted by: William and Paul Vanherweg

Grid 2 First session

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
3/31/2011	0700	61	4	0	0%	0%	0	0
	1500	85						
4/1/2011	0700	59	7	0	0%	0%	0	0-5
	1530	86						
4/2/2011	0700	61	7	0	30%	30%	0-5	5-10
	1600	73						
4/3/2011	0700	51	2	0	30%	0%	0-5	5-10
	1600	65						
4/4/2011	0700	48	5	0	0%	0%	0-5	0-5
	1530	72						

Second session

5/16/2011	0645	42	2	0	60%	100%	5-10	5-10
	1500	60						
5/17/2011	0700	48	7	0	80%	50%	5-10	0-5
	1530	62						
5/18/2011	0645	47	2	0	50%	10%	10-20	15-25
	1500	58						
5/19/2011	0645	53	1	0	0%	5%	0-5	5-10
	1530	66						
5/20/2011	0700	59	2	0	0%	5%	0-5	0-5
	1530	79						

Third session

7/5/2011	0600	73	13	0	10%	40%	0-5	0-5
	0930	90+						
7/6/2011	0600	73	22	0	10%	10%	0-5	0-5
	0945	90+						
7/7/2011	0600	75	40	0	80%	80%	0-5	0-5
	0945	90+						
7/8/2011	0600	79	24	0	30%	30%	5-10	0-5
	0900	90+						
7/9/2011	0600	79	24	0	0%	0%	0-5	0-5
	1530	90+						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grid 3 First session

DATE	TIME	TEMP °F air	CAPTURES AGS	CAPTURES MGS	Cloud Cover AM	Cloud Cover PM	Wind speed (Mi/hr) AM	Wind speed (Mi/hr) PM
3/31/2011	0700	61	10	0	0%	0%	0	0
	1500	85						
4/1/2011	0700	59	8	0	0%	0%	0	0-5
	1530	86						
4/2/2011	0700	61	4	0	30%	30%	0-5	5-10
	0845	73						
4/3/2011	0700	51.7	3	0	30%	0%	0-5	5-10
	1600	65						
4/4/2011	0700	48	3	0	0%	0%	0-5	0-5
	1530	72						

Second session

5/06/2011	0630	56	1	0	0%	0%	0-5	0-5
	1530	86						
5/07/2011	0630	64	5	0	0%	0%	0-5	10-20
	1500	82						
5/08/2011	0630	54	5	0	50%	30%	10-15	15-20
	1530	62						
5/09/2011	0630	48	4	0	10%	10%	0-5	15-20
	1400	62						
5/10/2011	0630	50	6	0	1%	0%	0-5	10-15
	1530	72						

Third session

6/30/2011	0600	63	20	0	0%	0%	0-5	0-5
	1130	90+	1 CGS					
7/1/2011	0600	73	29	0	0%	0%	0	0-5
	1000	90+						
7/2/2011	0600	68	22	0	0%	0%	0	0
	0830	90+	1CGS					
7/3/2011	0600	76	16	0	10%	5%	0	0
	0815	90+	1 CGS					
7/4/2011	0600	77	28	0	10%	30%	0	0-5
	0930	90+	2CGS					

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel, CGS= California ground squirrel

Grid 4 First session

DATE	TIME	TEMP °F air	CAPTURES AGS	CAPTURES MGS	Cloud Cover AM	Cloud Cover PM	Wind speed (Mi/hr) AM	Wind speed (Mi/hr) PM
3/26/2011	0700	42	0	0	50%	100%	5-10	10-20
	1500	52						
3/27/2011	0700	48	16	0	50%	5%	0-5	0-5
	1530	60						
3/28/2011	0700	51	13	0	5%	0%	0-5	0-5
	0845	62						
3/29/2011	0700	45	14	0	5%	60%	0-5	5-10
	1600	74						
3/30/2011	0700	47	12	0	10%	50%	0-5	0-5
	1530	79						

Second session

5/06/2011	0630	56	12	0	0%	0%	0-5	0-5
	1530	86						
5/07/2011	0630	64	9	0	0%	0%	0-5	10-20
	1500	82						
5/08/2011	0630	54	5	0	50%	30%	10-15	15-20
	1530	62						
5/09/2011	0630	48	3	0	10%	10%	0-5	15-20
	1400	62						
5/10/2011	0630	50	3	0	1%	0%	0-5	10-15
	1530	72						

Third session

6/30/2011	0600	63	26	0	0%	0%	0-5	0-5
	1130	90+	5 CGS					
7/1/2011	0600	73	23	0	0%	0%	0	0-5
	1000	90+	2 CGS					
7/2/2011	0600	68	18	0	0%	0%	0	0
	0830	90+	2 CGS					
7/3/2011	0600	76	15	0	10%	5%	0	0
	0815	90+	2 CGS					
7/4/2011	0600	77	32	0	10%	30%	0	0-5
	0930	90+	2CGS					

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel, CGS= California ground squirrel

Grid 5 First session

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
4/5/2011	0700	58	7	0	0%	0%	0-5	5-10
	1500	77						
4/6/2011	0700	52	39	0	80%	0%	5-10	5-10
	1530	69						
4/7/2011	0700	43	34	0	0%	100%	10-15	15-20
	1400	53						
4/8/2011	0830	40	45	0	0%	100%	5-10	5-10
	1200	45						
4/9/2011	0830	40	54	0	0%	10%	0-5	15-20
	1500	52						

Second session

5/11/2011	0630	57	8	0	0%	0%	0-5	0-5
	1530	79						
5/12/2011	0630	62	6	0	0%	0%	0-5	0-5
	1530	88						
5/13/2011	0630	65	3	0	0%	80%	0	0-5
	1530	90+						
5/14/2011	0630	59	3	0	0%	10%	5-10	5-10
	1500	76						
5/15/2011	0630	40	2	0	50%	20%	5-10	15-25
	1500	60						

Third session

7/5/2011	0600	73	13	0	10%	40%	0-5	0-5
	0930	90+						
7/6/2011	0600	73	22	0	10%	10%	0-5	0-5
	0945	90+						
7/7/2011	0600	75	40	0	80%	80%	0-5	0-5
	0945	90+						
7/8/2011	0600	79	24	0	30%	30%	5-10	0-5
	0900	90+						
7/9/2011	0600	79	24	0	0%	0%	0-5	0-5
	0915	90+						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grids 6 and7

Visual Surveys were conducted by: Gin Ingrahm

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS –*Bromus tectorum, Bromus madritensis., Erodium cicutarium, Amsinckia sp.*

DOMINANT PERENNIALS-, *Larrea tridentate, Yucca brevifolia, Ephedra trifurca, Eriogonum fasciculatum, Ericameria* sp., *Achnatherum* sp., *Poa* sp., *Hymenoclea salsola,*

OTHER PERENNIALS-, *Tetradymia spinosa, Encelia farinosa, Grayia spinosa, Krascheninnikovia lanata, Lycium andersonii, Yucca* sp., *Opuntia* sp., *Lepidospartum squamatum.*

Elevation – Approx. 3,000 to 3,200 ft **Slope** – 0% - 5%

Trapping conducted by: Gin Ingrahm

First Sampling Term Grid #6								
DATE	TIME	TEMP ^{F} air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)/Dir.	
			AGS	MGS	AM	PM	AM	PM
4/11/2011	630	41	10	0	95%	45%	0-5 w	5-10 w
	1530	67						
4/12/2011	645	52	7	0	20%	0%	5-10 w	10-12 w
	1545	69						
4/13/2011	650	47	4	0	10%	30%	10-15 nw	15-20 nw
	1550	55						
4/14/2011	650	45	9	0	5%	5%	0-5 var	5-10 w
	1550	68						
4/15/2011	640	43	6	0	5%	0%	0-5 se	5-10 w
	1550	75						
Second Sampling Term								
5/26/2011	600	51	26	0	50%	10%	0-5 w	0-5 w
	1530	69						
5/27/2011	600	54	25	0	5%	5%	0-5 w	5-10 w
	1500	76						
5/28/2011	600	54	12	0	60%	40%	5-10 w	5-10 w
	1500	70						
5/29/2011	930	49	8	0	40%	30%	20+ nw	20+ nw
	1415	55						
5/30/2011	600	47	16	0	0%	0%	5-10 w	0-5 w
	1530	77						
Third Sampling Term								
6/15/2011	530	73	10	0	0%	0%	5-10 w	0-5 w
	1015	90+						
6/16/2011	550	68	35	0	0%	5%	0-5 w	5-10 w
	1210	90+						
6/17/2011	530	65	51	0	20%	15%	0	0-5 sw
	1415	88						
6/18/2011	545	70	56	0	0%	0%	5-10 w	5-10 w
	1515	89						
6/19/2011	530	65	32	0	80%	0%	5-10 w	5-10 w
	1415	90+						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

First Term Grid #7								
DATE	TIME	TEMP F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)/Dir.	
			AGS	MGS	AM	PM	AM	PM
4/18/2011	630	55	8	0	70%	60%	5-10 w	8-12 w
	1515	70						
4/19/2011	620	55	7	0	60%	15%	5-10 w	15-18 w
	1530	73						
4/20/2011	620	55	6	0	30%	40%	5-10 w	20+
	1530	74						
4/21/2011	620	54	1	0	35%	25%	10-15 w	15-20 w
	1530	67						
4/22/2011	620	51	3	0	0%	50%	0-5 w	10-15 w
	1600	68						
Second Sampling Term								
5/21/2011	545	60	4	0	20%	40%	5-10 w	5-10 w
	1530	81						
5/22/2011	615	59	9	0	0%	90%	0-5 w	10-15 w
	1500	80						
5/23/2011	550	53	10	0	45%	5%	5-10 nw	20+
	1520	66						
5/24/2011	615	51	12	0	25%	0%	5-10 w	5-10 w
	1530	76						
5/25/2011	600	62	7	0	0%	45%	0-5 w	10-15 nw
Third Sampling Term								
6/20/2011	530	64	45	0	0%	0%	0-5 w	0-5 ne
	1020	90+						
6/21/2011	540	73	28	0	0%	0%	0-5 w	0-5 se
	945	90+						
6/22/2011	530	79	47	0	0%	0%	0-5 w	0-5 w
	820	90+						
6/23/2011	530	77	63	0	0%	0%	0-5 w	5-10 w
	930	90+						
6/24/2011	540	71	76	0	0%	0%	5-10 w	5-10 w
	1150	90+						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grid 8

Visual Surveys were conducted by: Bill Vanherweg
Results of Visual Survey: No MGS were observed

ANNUALS – *Erodium cicutarium, Amsinckia sp., Bromus tectorum, Bromus madritensis., Mentzelia sp., Sphaeralcea sp.,*

PERENNIALS-, *Hymenoclea salsola, Yucca brevifolia, Ericameria sp., Eriogonum Sp.,* Juniperus californicus, *Cylindropuntia sp., Encelia farinosa, Ephedra sp.*

Elevation – Approx. 3,600 ft **Slope –** 0% - 5%

Trapping conducted by: Alex Brown

Grid 8

First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS	MGS	Cloud Cover AM		Wind speed (Mi/hr)	
4/16/2011	0630	52.2	0	0	15%	4/16/2011	0630	52.2
	1000	54.2					1000	54.2
4/17/2011	0625	53.4	0	0	20%	4/17/2011	0625	53.4
	0830	54.6					0830	54.6
4/18/2011	0635	52.1	0	0	25%	4/18/2011	0635	52.1
	0845	50.7					0845	50.7
4/19/2011	0640	51.7	1	0	80%	4/19/2011	0640	51.7
	1030	62.2					1030	62.2
4/20/2011	0630	48.6	0	0	40%	4/20/2011	0630	48.6
	1845	53.1					1845	53.1

Second Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS	MGS	Cloud Cover AM	PM	Wind speed (Mi/hr) AM	PM
5/20/2011	0615	59	2	0	10%	10%	10-20	30+
	1430	75.3						
5/21/2011	0620	57.8	1	0	15%	20%	15-20	30+
	1015	71.3						
5/22/2011	0615	55.6	1	0	10%	10%	10-15	30+
	1400	77.2						
5/23/2011	0600	52.3	2	0	80%	60%	25-30	30+
	0930	56.1						
5/24/2011	0600	50.3	1	0	50%	40%	0-5	30+
	1000	66.3						

Nocturnal Species Captured: Long-tailed Weasel, Deer mouse, Merriam's kangaroo rat, Panamint kangaroo rat.

Third Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS	CGS	MGS	Cloud Cover AM	PM	Wind speed (Mi/hr) AM	PM
6/15/2011	0615	67.5	1	0	0	0 %	0 %	0-5	10-15
	1015	90+							
6/16/2011	0638	68.9	1	1	0	0 %	0 %	25-30	30+
	0930	84.2							
6/17/2011	0545	54.9	3	1	0	5%	0 %	20-25	30+
	1130	80.4							
6/18/2011	0545	61.2	8	2	0	0 %	0 %	20-25	30+
	1330	87.8							
6/19/2011	0625	63.4	2	5	0	60%	10 %	20-25	30+
	0915	72.5							

*AGS=antelope ground squirrel, CGS= California ground Squirrel, MGS=Mohave ground squirrel

Grids 9-12

Visual Surveys were conducted by: Gin Ingrahm

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS –*Bromus tectorum, Bromus madritensis., Erodium cicutarium, Amsinckia* sp .

DOMINANT PERENNIALS-, *Larrea tridentate, Yucca brevifolia, Ephedra trifurca, Eriogonum fasciculatum, Ericameria* sp., *Achnatherum* sp., *Poa* sp., *Hymenoclea salsola,*

OTHER PERENNIALS-, *Tetradymia spinosa, Encelia farinosa, Grayia spinosa, Krascheninnikovia lanata, Lycium andersonii, Yucca* sp., *Opuntia* spp., *Lepidospartum squamatum.*

Elevation – Approx. 3,000 to 3,200 ft **Slope –** 0% - 5%

Trapping conducted by: Gin Ingrahm

First Term Grid #9								
DATE	TIME	TEMP F air/gnd	CAPTURES		Cloud Cover		Wind speed (Mi/hr)/Dir.	
			AGS	MGS	AM	PM	AM	PM
4/4/2011	700	42	5	0	0%	0%	5-10 n	0-3 w
	1530	72						
4/5/2011	700	52	8	0	35%	10%	0-5 sw	15-20 sw
	1550	75						
4/6/2011	645	50	6	0	100%	35%	13-15 w	18-22 w
	1600	68						
4/7/2011	645	41	2	0	15%	100%	20-25 nw	18-20 nw
	1445	50						
4/8/2011	950	43	0	0	5%	85%	5-10 w	10-12 sw
	1445	50						
Second Sampling Term								
5/11/2011	600	55	3	0	5%	5%	5-10 nw	0-5 w
	1515	84						
5/12/2011	600	58	2	0	0%	5%	0-5 w	0-5 se
	1530	87						
5/13/2011	600	58	4	0	0%	5%	0-5 w	0-5 se
	1530	87						
5/14/2011	600	56	2	0	0%	95%	10-15 w	5-10 w
	1515	84						
5/15/2011	700	48	1	0	65%	85%	0-5 w	5-10 w
	1600	54						
Third Sampling Term								
6/26/2011	540	71	34	0	0%	0%	5-10 nw	5-10 w
	1115	90+						
6/27/2011	540	72	48	0	0%	0%	5-10 w	0-5 e
	940	90+						
6/28/2011	540	71	45	0	0%	0%	5-10 w	5-10 sw
	1050	90+						
6/29/2011	540	58	104	0	0%	30%	0-5 sw	10-15 w
	1500	80						
6/30/2011	550	60	66	0	0%	0%	0-5 w	0-5 nw
	1350	90+						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Nocturnal Results – Totals

Peromyscus maniculatus – 13, *Dipodomys panamintinus* – 17, *Neotoma lepida* – 2

Firstrst Term Grid #10								
DATE	TIME	TEMP F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)/Dir.	
			AGS	MGS	AM	PM	AM	PM
3/28/2011	645	47	3	0	35%	15%	0-5 w	15-20 w
	1510	58						
3/29/2011	700	48	8	0	45%	80%	0-2 n	18-20 sw
	1500	66						
3/30/2011	650	44	7	0	25%	80%	0-4 nw	0-2 var
	1530	78						
3/31/2011	650	54	7	0	5%	5%	0-4 nw	0-5 e
	1515	84						
4/1/2011	645	55	5	0	0%	0%	0-5 nw	5-8 nw
	1600	88						
Second Sampling Term								
5/6/2011	600	69	2	0	0%	0%	5-10 w	10-15 w
	1500	88						
5/7/2011	600	62	3	0	0%	0%	10-15 w	15-20 w
	1500	80						
5/8/2011	600	52	3	0	35%	50%	5-10 nw	15-20 w
	1445	66						
5/9/2011	700	46	1	0	40%	30%	15-20 w	20+
	1530	60						
5/10/2011	600	45	2	0	5%	30%	15-20 w	10-15 w
	1500	68						
Third Sampling Term								
7/1/2011	540	59	39	0	0%	0%	0-5 w	0-5 e
	1030	90+						
7/2/2011	540	70	40	0	0%	0%	0-5 w	0-5 e
	910	90+						
7/3/2011	540	70	16	0	5%	0%	0-5 w	0-5 se
	820	90+						
7/4/2011	540	72	37	0	20%	50%	0-5 sw	0-5 e
	920	90						
7/5/2011	540	72	45	0	25%	65%	0-5 w	0-5 se
	1000	90+						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

First Term Grid #11								
DATE	TIME	TEMP F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)/Dir.	
			AGS	MGS	AM	PM	AM	PM
3/21/2011	1130	50	5	0	85%	45%	5-10 w	5-10 w
	1600	53						
3/22/2011	830	43	4	0	30%	20%	8-10 nw	5-10 w
	1630	56						
3/23/2011	730	40	2	0	90%	100%	0-5 nw	0-2 w
	1230	56						
3/24/2011	745	40	5	0	10%	95%	5-8 nw	10-15 nw
	1615	50						
3/25/2011	720	40	6	0	75%	80%	15-20 nw	15-20 nw
	1100	47						
Second Sampling Term								
5/1/2011	615	46	4	0	0%	0%	0-5 nw	0-5 ne
	1530	71						
5/2/2011	610	41	3	0	5%	0%	0-5 nw	0-5 w
	1530	76						
5/3/2011	605	61	0	0	0%	0%	5-10 nw	5-10 nw
	1545	87						
5/4/2011	610	50	1	0	0%	0%	0-5 nw	0-5 nw
	1600	87						
5/5/2011	610	56	1	0	0%	30%	0-5 w	0-5 w
	1430	90+						
Third Sampling Term								
7/6/2011	540	74	72	0	50%	10%	0-5 nw	0-5 sw
	1015	90+						
7/7/2011	550	78	58	0	85%	70%	5-10 w	0-5 w
	1050	90+						
7/8/2011	550	78	45	0	40%	25%	10-15 nw	10-15 nw
	915	90+						
7/9/2011	550	78	49	0	0%	0%	10-15 nw	5-10 nw
	945	90+						
7/10/2011	550	77	39	0	0%	0%	5-10 w	10-15 w
	940	90+						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Nocturnal Results – Totals

Peromyscus maniculatus – 8, *Dipodomys panamintinus* – 38, *Neotoma lepida* – 4

First Term Grid #12								
DATE	TIME	TEMP ^{F} air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)/Dir.	
			AGS	MGS	AM	PM	AM	PM
3/16/2011	1045	50	0	0	0%	0%	5-10 w	20-25 nw
	1400	63						
3/17/2011	1045	50	4	0	100%	50%	10 nw	20 nw
	1530	65						
3/18/2011	945	59	5	0	0%	90%	0-5 w	8-10 w
	1445	69						
3/19/2011	915	50	6	0	95%	100%	5 nw	8-10 nw
	1300	54						
3/20/2011	1400	49	0	0	100%	100%	10-15 w	10-15 w
	1600	50						
Second Sampling Term								
5/16/2011	600	41	2	0	100%	0%	0-5 w	5-10 w
	1515	64						
5/17/2011	630	46	3	0	80%	50%	0-5 sw	10-15 sw
	1500	67						
5/18/2011	610	46	2	0	70%	25%	5-10 w	20+ nw
	1510	58						
5/19/2011	600	47	0	0	10%	10%	5-10 w	15-20 w
	1515	65						
5/20/2011	600	55	2	0	0%	10%	5-10w	5-10 w
	1510	79						
Third Sampling Term								
7/11/2011	550	72	35	0	0%	0%	10-15 w	5-10 w
	1120	90+						
7/12/2011	550	67	88	0	0%	0%	10-15 nw	0-5 nw
	1340	90+						
7/13/2011	550	64	146	0	0%	0%	15-20 w	10-15 w
	1500	85						
7/14/2011	600	60	142	0	5%	0%	0-5 w	10-15 w
	1500	83						
7/15/2011	550	60	133	0	0%	5%	5-10 w	10-15 w
	1530	84						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

GRID 13

Visual Surveys were conducted by: Bill Vanherweg

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS – *Erodium cicutarium, Amsinckia sp., Bromus madritensis., Eriastrum sp., Baileya sp., Stephanomeria sp.*

DOMINANT PERENNIALS-, *Larrea tridentata, Hymenoclea salsola, , Ericameria sp., Chrysothamnus nauseosus, Eriogonum fasciculatum*

OTHER PERENNIALS- *Yucca brevifolia, Lycium andersonii, Lycium cooperi, Tetradymia spinosa, Krascheninnikovia lanata, Cylindropuntia sp., Encelia farinosa., Achnatherum sp., Yucca brevifolia, Ambrosia dumosa, Opuntia sp.*

Elevation – Approx. 2,900 to 3,100 ft **Slope –** 0% - 3%

Trapping conducted by: Chris Halley

---Family of burrowing owls (5 observed) residing at grid 13. Seen during session 3.

Grid 13

First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES* AGS	CAPTURES* MGS	Cloud Cover(%) AM	Cloud Cover(%) PM	Wind speed (Mi/hr) AM	Wind speed (Mi/hr) PM
4/11/2011	0800	50	1	0	60	70	0-5	0-5
	1400	69						
4/12/2011	0830	51	2	0	5	1	10-15	10-15
	1330	67						
4/13/2011	1100	47	1	0	30	30	30+	30+
	1230	50						
4/14/2011	0900	50	0	0	1	35	0-5	0-5
	1400	66						
4/15/2011	0830	51	1	0	15	15	15-20	20-25
	1500	73						

Second Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS	CAPTURES MGS	Cloud Cover(%) AM	Cloud Cover(%) PM	Wind speed (Mi/hr) AM	Wind speed (Mi/hr) PM
5/12/2011	0615	56	22	0	0	0	10-15	15-20
	1500	88						
5/13/2011	0615	58	40	0	0	70	0-5	0-5
	1300	92						
5/14/2011	0615	52	54	0	40	15	0-5	5-10
	1500	80						
5/15/2011	1100	49	81	0	80	70	20-25	15-20
	1330	54						
5/16/2011	1000	50	59	0	70	50	5-10	15-20
	1345	60						

Third Sampling Term

DATE	TIME	TEMP °F air	CAPTURES AGS	CAPTURES MGS	Cloud Cover(%) AM	Cloud Cover(%) PM	Wind speed (Mi/hr) AM	Wind speed (Mi/hr) PM
7/11/2011	0530	69	32	0	0	0	0-5	0-5
	1000	90						
7/12/2011	0530	70	78	0	0	1	5-10	10-15
	1000	90						
7/13/2011	0545	60	148	0	0	5	15-20	5-10
	1330	88						
7/14/2011	0545	61	178	0	0	5	15-20	10-15
	1430	88						
7/15/2011	0545	64	122	0	0	1	5-10	10-15
	1430	92						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Nocturnal Results – Totals

Peromyscus maniculatus – 51, *Dipodomys meriami* –1, *Dipodomys panamintinus* – 52, *Neotoma lepida* – 2, *Onchomys torridus* – 3

GRID 14

Visual Surveys were conducted by: Bill Vanherweg

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS – *Erodium cicutarium, Amsinckia sp., Bromus madritensis., Eriastrum sp., Xylorhiza tortifolia, Mirabilis sp.,Chaenactis sp.,Malacothirx glabrata, Loeseliastrum sp.*

DOMINANT PERENNIALS- *Yucca brevifolia, Larrea tridentata, Krascheninnikovia lanata, Ericameria sp., Eriogonum fasciculatum*

OTHER PERENNIALS- *Grayia spinosa, Lycium andersonii, Lycium cooperi, Tetradymia spinosa, Cylindropuntia sp., Encelia farinosa., Achnatherum sp., Ephedra sp., Opuntia sp., Hymenoclea salsola*

Elevation – Approx. 3,000 to 4,000 ft **Slope** – 0% - 3%

Trapping conducted by: Chris Halley

---Observed at grid 14, pair of Swainson's hawks hunting during sessions 1 and 2 , and barn owl in old growth Joshua tree.

Grid 14
First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES*		Cloud Cover(%)		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
3/30/2011	0800	50	8	0	30	60	0-5	5-10
	1500	88						
3/31/2011	0715	52	9	0	5	5	0-5	0-5
	1500	83						
4/1/2011	0715	54	11	0	0	0	0-5	5-10
	1500	87						
4/2/2011	0700	52	6	0	60	40	5-10	10-15
	1430	77						
4/3/2011	0645	49	7	0	65	10	10-15	10-15
	1100	61						

Grid 14
Second Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover(%)		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
5/2/2011	0645	50	25	0	2	0	0-5	5-10
	1500	86						
5/3/2011	0630	53	37	0	0	0	0-5	5-10
	1530	85						
5/4/2011	0630	53	40	0	0	0	0-5	5-10
	1530	88						
5/5/2011	0615	57	28	0	0	0	0-5	10-15
	1330	91						
5/6/2011	0615	61	40	0	70	50	10-15	5-10
	1415	88						

Grid 14
Third Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover(%)		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
6/16/2011	0530	69	43	0	0	15	15-20	10-15
	1300	90						
6/17/2011	0530	66	51	0	30	30	0-5	15-20
	1300	90						
6/18/2011	0530	65	52	0	0	0	15-20	5-10
	1330	90						
6/19/2011	0530	66	62	0	70	0	5-10	15-20
	1400	91						
6/20/2011	0545	63	66	0	0	0	1-5	1-5
	1130	91						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel (Trap captures not recorded above include California ground squirrel (CGS), desert spiny lizard, desert woodrat and cactus wren).

GRID 15

Visual Surveys were conducted by: Bill Vanherweg

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS – *Erodium cicutarium, Amsinckia sp., Bromus madritensis., Eriastrum sp., Xylorhiza tortifolia, Loeseliastrum sp., Lasthemia califonica, Mirabilis sp.*

DOMINANT PERENNIALS- *Yucca brevifolia, Larrea tridentata, Krascheninnikovia lanata, Eriogonum fasciculatum, Hymenoclea salsola*

OTHER PERENNIALS- *Ericameria sp., Grayia spinosa, Lycium andersonii, Lycium cooperi, Atriplex sp., Tetradymia spinosa, Cylindropuntia sp., Encelia farinosa., Achnatherum sp, Ephedra sp., Opuntia sp., Ambrosia dumosa*

Elevation – Approx. 3,000 to 4,000 ft

Slope – 0% - 3%

Trapping conducted by: Chris Halley

Grid 15
First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES*		Cloud Cover(%)		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
4/4/2011	0900	53	10	0	0	5	0-5	0-5
	1400	70						
4/5/2011	0800	51	19	0	20	25	0-5	5-10
	1500	75						
4/6/2011	0830	51	16	0	50	35	0-5	5-10
	1500	66						
4/7/2011	1000	49	1	0	25	90	5-10	5-10
	1230	50						
4/8/2011	1130	47	0	0	30	80	5-10	10-15
	1545	54						

Grid 15
Second Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover(%)		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
5/7/2011	0630	55	30	0	0	0	0-5	30+
	1400	86						
5/8/2011	0630	50	44	0	70	75	15-20	20-25
	1330	66						
5/9/2011	1000	50	68	0	40	65	10-15	10-15
	1530	59						
5/10/2011	0800	50	61	0	5	0	10-15	15-20
	1400	69						
5/11/2011	0715	51	71	0	10	0	10-15	10-15
	1415	77						

Grid 15
Third Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover(%)		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
6/21/2011	0545	72	66	0	0	0	0-5	0-5
	0930	90						
6/22/2011	0530	74	69	0	0	0	10-15	5-10
	0830	90						
6/23/2011	0545	73	81	0	0	0	10-15	10-15
	0900	90						
6/24/2011	0530	68	82	0	0	0	15-20	20-25
	1015	90						
6/25/2011	0530	67	71	0	0	0	20-25	10-15
	1045	89						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Nocturnal Results – Totals

Peromyscus maniculatus – 7, *Dipodomys meriami* –3, *Dipodomys panamintinus* – 23, *Neotoma lepida* – 8, *Onychomys torridus* – 3, *Perognathus longimembris*(7 grams) - 1

GRID 16

Visual Surveys were conducted by: Bill Vanherweg

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS – *Erodium cicutarium, Amsinckia sp., Bromus madritensis., Eriastrum sp., Xylorhiza tortifolia, Loeseliastrum sp.*

DOMINANT PERENNIALS- *Yucca brevifolia, Larrea tridentata, Krascheninnikovia lanata, Encelia farinosa., Ephedra sp.*

OTHER PERENNIALS- *Ericameria sp., Grayia spinosa, Lycium andersonii, Lycium cooperi, Tetradymia spinosa, Cylindropuntia sp., Achnatherum sp., Opuntia sp., Ambrosia dumosa, Eriogonum fasciculatum, Hymenoclea salsola, Chrysothamnus nauseosus*

Elevation – Approx. 3,000 to 4,000 ft

Slope – 0% - 3%

Trapping conducted by: Chris Halley

Grid 16
First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES*		Cloud Cover(%)		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
4/26/2011	0930	50	6	0	50	2	15-20	10-15
	1500	69						
4/27/2011	0700	51	22	0	2	15	0-5	10-15
	1500	77						
4/28/2011	0630	52	22	0	30	20	10-15	5-10
	1500	68						
4/29/2011	1045	50	9	0	0	0	25-30	10-15
	1400	66						
4/30/2011	0930	49	9	0	0	0	10-15	10-15
	1500	68						

Grid 16
Second Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover(%)		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
5/17/2011	0900	50	12	0	85	50	0-5	5-10
	1430	60						
5/18/2011	1200	50	29	0	35	40	30+	20-25
	1330	51						
5/19/2011	0800	49	39	0	30	20	5-10	20-25
	1400	62						
5/20/2011	0630	51	54	0	0	10	10-15	5-10
	1400	80						
5/21/2011	0600	58	58	0	50	45	10-15	10-15
	1415	87						

Grid 16
Third Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover(%)		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
6/26/2011	0545	70	46	0	0	0	20-25	10-15
	1130	90						
6/27/2011	0530	66	64	0	0	0	25-30	10-15
	1030	90						
6/28/2011	0530	68	55	0	0	0	10-15	5-10
	1100	90						
6/29/2011	0545	64	50	0	50	60	10-15	10-15
	1515	82						
6/30/2011	0530	60	55	0	10	0	5-10	5-10
	1030	90						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel (Trap captures not recorded above include California ground squirrel (CGS), desert spiny lizard, western whiptail, desert woodrat and cactus wren).

GRID 17

Visual Surveys were conducted by: Bill Vanherweg

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS – *Erodium cicutarium, Amsinckia sp., Bromus madritensis., Eriastrum sp., Loeseliastrum sp., Chaenactis sp.,Stephanomeria sp., Astragalus sp.*

DOMINANT PERENNIALS - *Yucca brevifolia, Larrea tridentata, Krascheninnikovia lanata, Encelia farinosa., Ephedra sp.*

OTHER PERENNIALS - *Ericameria sp., Grayia spinosa, Lycium andersonii, Lycium cooperi, Tetradymia spinosa, Cylindropuntia sp., Achnatherum sp., Opuntia sp., Ambrosia dumosa, Eriogonum fasciculatum, Hymenoclea salsola, Chrysothamnus nauseosus*

Elevation – Approx. 3,000 to 4,000 ft

Slope – 0% - 3%

Trapping conducted by: Chris Halley

Grid 17
First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES*		Cloud Cover(%)		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
4/21/2011	0645	50	8	0	40	40	20-25	10-15
	1400	70						
4/22/2011	0715	49	13	0	5	15	20-25	10-15
	1200	73						
4/23/2011	0700	50	11	0	20	20	10-15	10-15
	1500	67						
4/24/2011	0730	50	9	0	30	50	10-15	10-15
	1300	68						
4/25/2011	0730	50	11	0	70	50	10-15	5-10
	1400	71						

Grid 17
Second Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover(%)		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
5/22/2011	0600	57	50	0	40	50	5-10	15-20
	1500	77						
5/23/2011	0715	50	22	0	60	10	25-30	30+
	1500	72						
5/24/2011	0700	52	30	0	50	0	5-10	30+
	1500	72						
5/25/2011	0630	60	55	0	15	0	5-10	15-20
	1300	88						
5/26/2011	0745	50	49	0	40	30	20-25	20-25
	1300	70						

Grid 17
Third Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover(%)		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
7/6/2011	0530	75	48	0	5	15	0-5	0-5
	0930	90						
7/7/2011	0530	74	40	0	80	70	15-20	10-15
	0930	91						
7/8/2011	0530	70	51	0	65	25	15-20	10-15
	1000	90						
7/9/2011	0530	69	70	0	0	0	0-5	0-5
	1000	90						
7/10/2011	0530	71	49	0	unk	unk	unk	unk
	0940	90						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Nocturnal Results – Totals

Peromyscus maniculatus – 9, *Dipodomys panamintinus* – 28, *Neotoma lepida* – 13, *Onchomys torridus* – 9, *Perognathus longimembris* - 2

GRID 18

Visual Surveys were conducted by: Bill Vanherweg

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS – *Erodium cicutarium, Amsinckia sp., Bromus madritensis., Eriastrum sp., Stephanomeria sp., Astragalus sp.*

DOMINANT PERENNIALS - *Yucca brevifolia, Larrea tridentata, Ephedra sp., Tetradymia spinosa, Achnatherum sp., Ericameria sp., Hymenoclea salsola*

OTHER PERENNIALS - *Krascheninnikovia lanata, Encelia farinose, Grayia spinosa, Lycium andersonii, Lycium cooperi, Cylindropuntia sp., Achnatherum sp., Opuntia sp., Ambrosia dumosa, Eriogonum fasciculatum, Chrysothamnus nauseosus*

Elevation – Approx. 3,000 to 4,000 ft **Slope –** 0% - 3%

Trapping conducted by: Chris Halley

Grid 18
First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES*		Cloud Cover(%)		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
4/16/2011	0700	50	1	0	20	20	10-15	10-15
	1500	67						
4/17/2011	0730	50	2	0	30	50	10-15	10-15
	1300	68						
4/18/2011	0730	50	3	0	70	50	5-10	5-10
	1400	71						
4/19/2011	0930	50	5	0	50	2	10-15	10-15
	1500	63						
4/20/2011	0700	51	6	0	2	15	0-5	10-15
	1500	77						

Grid 18
Second Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover(%)		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
5/27/2011	0700	50	31	0	5	10	15-20	15-20
	1300	74						
5/28/2011	0645	50	47	0	15	15	10-15	15-20
	1400	72						
5/29/2011	1500	50	8	0	75	30	20-25	25-30
	1530	53						
5/30/2011	0745	51	58	0	0	0	0-5	0-5
	1500	79						
5/31/2011	0645	52	54	0	30	30	5-10	5-10
	1330	79						

Grid 18
Third Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover(%)		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
7/1/2011	0545	63	24	0	0	0	5-10	0-5
	1030	91						
7/2/2011	0530	68	48	0	0	0	5-10	0-5
	0830	90						
7/3/2011	0530	70	29	0	0	0	5-10	0-5
	0845	91						
7/4/2011	0530	73	53	0	25	20	5-10	0-5
	0900	90						
7/5/2011	0530	70	38	0	40	40	0-5	5-10
	0930	90						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel (Trap captures not recorded above include California ground squirrel (CGS), desert spiny lizard, western whiptail, desert woodrat and cactus wren).

Grid 19

Visual Surveys were conducted by: Barbara M. Leitner
Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS – *Erodium cicutarium, Amsinckia tessellata, Schismus sp., Bromus tectorum, Bromus madritensis*

DOMINANT PERENNIALS- *Larrea tridentata*

OTHER PERENNIALS- *Hymenoclea salsola, Acamptopappus sphaerocephalus*, a few *Lycium* spp., *Ephedra californica*

Elevation – Approx. 3,360 ft **Slope – 0=2 %**

Trapping conducted by: Barbara M. Leitner

Grid 19
First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS*	MGS*	AM	PM	AM	PM
3/21/2011	1000	42	1	0	15 %	35%	0-8	10-15
	1812	48						
3/22/2011	0840	44	7	0	3%	5%	4-6	2-4
	1832	56						
3/23/2011	0650	48	9	0	35%	100%	0-1	0-2
	1630	67						
3/24/2011	0745	40	3	0	5%	85%	0-1	5-8
	1844	53						
3/25/2011	0710	46	2	0	10%	10%	2	11
	1815	55						

Second Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
5/8/2011	0615	53	1	0	5%	10%	2	11
	1800	64						
5/9/2011	0650	44	1	0	5%	5%	7	5
	1920	61						
5/10/2011	0630	46	0	0	1%	1%	5	6
	1909	68						
5/11/2011	0630	53	2	0	2%	0%	2	3
	1900	80						
5/12/2011	0620	52	1	0	0%	0%	2	2
	1500	93						

Third Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
7/1/2011	0620	65.6	10	0	0%	n/a	0-1	n/a
	1039	95.0						
7/2/2011	0556	72.4	11	0	0%	n/a	0-2	n/a
	1038	94.6						
7/3/2011	0545	75.7	11	0	5%	n/a	0-2	n/a
	1057	99.1						
7/4/2011	0545		11	0				
	1105							
7/5/2011	0605	72.7	15	0	10%	n/a	0-1	n/a
	1225	95.8						

Other captures: California ground squirrels (12 captures). *AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Nocturnal Results – Totals

Peromyscus maniculatus – 7, *Dipodomys panamintinus* – 15, *Onchomys torridus* – 2

GRID 20

Visual Surveys were conducted by: Barbara M. Leitner

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS – *Erodium cicutarium, Amsinckia tessellata, Schismus sp., Bromus tectorum, Bromus madritensis*

DOMINANT PERENNIALS- *Larrea tridentata*

OTHER PERENNIALS-Diverse assemblage of *Lycium cooperi, L. andersonii, Yucca brevifolia, Krascheninnikovia lanata, Acamptopappus sphaerocephalus, Senecio species.*

Elevation – Approx. 3,450 ft **Slope – 0-2 %**

Trapping conducted by: Barbara M. Leitner

Grid 20
First Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS*	MGS*	AM	PM	AM	PM
3/27/2011	0815	45	2	0	5 %	2%	0-5	5-8
	1900	56						
3/28/2011	0655	45	3	0	3%	3%	5-12	7-8
	1900	60						
3/29/2011	0700	46	4	0	20%	30%	0-5	10
	1900	66						
3/30/2011	0700	51	7	0	30%	30%	0-1	0-1
	1845	82						
3/31/2011	0640	62	14	0	CLEAR	1%	0-1	0-1
	1800	80						

Other species captured: California ground squirrel (5), sagebrush lizard (3), kangaroo rat (1)

Second Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
5/26/2011	0550	48	7	0	0%	0%	10	8
	1925	63						
5/27/2011	0605	48	15	0	0%	0%	8	6
	1930	63						
5/28/2011	0603	48	15	0	5%	5%	10	10
	1916	69						
5/29/2011	1330	49	7	0	60%	50%	5	5
	1812	56						
5/30/2011	0720	48	17	0	CLEAR	CLEAR	7	5
	1930	77						

Other species captured: whiptail (1) California ground squirrel (9), Peromyscus species (1)

Third Sampling Term

DATE	TIME	TEMP °F air	CAPTURES		Cloud Cover		Wind speed (Mi/hr)	
			AGS	MGS	AM	PM	AM	PM
7/6/2011	0550	77.7	9	0	0%	n/a	0-1	n/a
	1143	93.4						
7/7/2011	0550	74.9	16	0	10%	n/a	0-5	n/a
	1100	91.2						
7/8/2011	0553	75.2	16	0	30%	n/a	0-5	n/a
	1113	93.0						
7/9/2011	0548	74.0	20	0	0%	0%	0	n/a
	1210	95.4						
7/10/2011	0558	72.9	18	0	0%	n/a	0-1	n/a
	1055	92.6						

Other species captured: California ground squirrel (38 captures),*AGS=antelope ground squirrel, MGS=Mohave ground squirrel

Grids 21-24

Visual Surveys were conducted by: William Vanherweg

Results of Visual Survey: No MGS were observed

DOMINANT ANNUALS –*Bromus tectorum, Bromus madritensis., Erodium cicutarium, Amsinckia sp.*

DOMINANT PERENNIALS-, *Larrea tridentata Yucca brevifolia, Ephedra trifurca, Eriogonum fasciculatum, Ericameria sp., Achnatherum* sp., *Poa sp., Hymenoclea salsola,*

OTHER PERENNIALS- Juniperus californicus, *Tetradymia spinosa, Encelia farinosa, Grayia spinosa, Krascheninnikovia lanata, Lycium andersonii, Yucca sp., Opuntia sp., Lepidospartum squamatum,.*

Elevation – Approx. 3,200 to 3,300 ft **Slope** – 0% - 5%

Trapping conducted by: William and Paul Vanherweg

Grid 21 First session

DATE	TIME	TEMP °F air	CAPTURES AGS	CAPTURES MGS	Cloud Cover AM	Cloud Cover PM	Wind speed (Mi/hr) AM	Wind speed (Mi/hr) PM
3/20/2011	0700	40	3	0	20%	20%	0-5	5-10
	1600	62						
3/21/2011	0700	41	7	0	30%	5%	0-5	0-5
	1700	61						
4/22/2011	0700	46	3	0	80%	100%	0-5	5-10
	1500	53						
4/23/2011	0800	40	3	0	50%	80%	5-10	10-15
	1530	53						
4/24/2011	0700	43	5	0	20%	20%	10-15	10-15
	1500	54						

Second session

5/01/2011	0630	54	6	0	0%	0%	5-10	0-5
	1600	75						
5/02/2011	0630	50	3	0	0%	0%	0-5	0-5
	1600	76						
5/03/2011	0630	60	1	0	0%	0%	0-5	5-10
	1530	82						
5/04/2011	0600	57	0	0	0%	00%	0-5	0-5
	1530	87						
5/05/2011	0630	62	2	0	0%	0%	0-5	0-5
	1330	90+						

Third session

6/20/2011	0600	67	15	0	0%	0%	0-5	0-5
	1130	90+	1 CGS					
6/21/2011	0600	76	17	0	0%	0%	0-5	0
	1000	90+	1CGS					
6/22/2011	0600	80	21	0	0%	0%	0-5	0-5
	0830	90+	3 CGS					
6/23/2011	0600	80	14	0	0%	0%	0-5	0-5
	0815	90+	4 CGS					
6/24/2011	0600	76	18	0	0%	0%	5-10	5-10
	0930	90+	2 CGS					

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel, CGS=California ground squirrel

Nocturnal Results – Totals

Perognathus inornatus - 1, Peromyscus maniculatus – 12, *Dipodomys panamintinus* – 72, *Onchomys torridus* – 1

Grid 22 First session

DATE	TIME	TEMP °F air	CAPTURES AGS	CAPTURES MGS	Cloud Cover AM	Cloud Cover PM	Wind speed (Mi/hr) AM	Wind speed (Mi/hr) PM
4/10/2011	0700	47	5	0	0%	0%	0-5	0-5
	1600	66						
4/11/2011	0700	48	9	0	100%	90%	0-5	10-15
	1700	66						
4/12/2011	0700	50	7	0	5%	0%	10-15	0-5
	1500	60						
4/13/2011	0800	48	6	0	5%	15%	0-5	25-30
	1530	58						
4/14/2011	0700	45	6	0	0%	80%	0-5	10-15
	1500	66						

Second session

5/06/2011	0630	65	13	0	30%	10%	0-5	0-5
	1400	76	3 CGS					
5/07/2011	0630	62	11	0	0%	0%	5-10	0-5
	1400	75	8CGS					
5/08/2011	0630	56	4	0	90%	0%	5-10	0-5
	1500	72	3CGS					
5/09/2011	0630	54	11	0	10%	0%	5-10	10-20
	1500	75	6 CGS					
5/10/2011	0630	59	2	0	0%	0%	0-5	5-10
	1300	90+	2CGS					

Third session

7/10/2011	0600	75	15	0	1%	0%	0-5	0-5
	0930	90+						
7/11/2011	0600	75	26	0	0%	0%	5-10	0-5
	0930	90+						
7/12/2011	0600	71	27	0	0%	0%	5-10	0-5
	1000	90+						
7/13/2011	0600	70	53	0	0%	0%	5-10	10-25
	1400	88						
7/14/2011	0600	70	57	0	0%	0%	5-10	10-15
	1430	90+						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel, CGS= California ground squirrel

Grid 23 First session

DATE	TIME	TEMP °F air	CAPTURES AGS	CAPTURES MGS	Cloud Cover AM	Cloud Cover PM	Wind speed (Mi/hr) AM	Wind speed (Mi/hr) PM
4/5/2011	0700	58	8	0	0%	0%	0-5	5-10
	1500	77						
4/6/2011	0700	52	2	0	80%	0%	5-10	5-10
	1530	69						
4/7/2011	0700	43	3	0	0%	100%	10-15	15-20
	1400	53						
4/8/2011	0830	40	1	0	0%	100%	5-10	5-10
	1200	45						
4/9/2011	0830	40	2	0	0%	10%	0-5	15-20
	1500	52						

Second session

5/11/2011	0630	57	6	0	0%	0%	0-5	0-5
	1530	79						
5/12/2011	0630	62	2	0	0%	0%	0-5	0-5
	1530	88	1 CGS					
5/13/2011	0630	65	1	0	0%	80%	0	0-5
	1530	90+						
5/14/2011	0630	59	3	0	0%	10%	5-10	5-10
	1500	76						
5/15/2011	0630	40	3	0	50%	20%	5-10	15-25
	1500	60						

Third session

6/25/2011	0600	75	18	0	0%	0%	0-5	0
	0945	90+	1 CGS					
6/26/2011	0600	75	42	0	0%	0%	5-10	5-10
	1130	90+						
6/27/2011	0600	75	34	0	0%	0%	0-5	0-5
	1000	90+	1CGS					
6/28/2011	0600	73	31	0	0%	0%	5-10	0-5
	0930	90+						
6/29/2011	0630	65	59	0	0%	5%	0-5	15-25
	1500	82						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel, CGS California ground squirrel

Grid 24 First session

DATE	TIME	TEMP °F air	CAPTURES AGS	CAPTURES MGS	Cloud Cover AM	Cloud Cover PM	Wind speed (Mi/hr) AM	Wind speed (Mi/hr) PM
4/10/2011	0700	47	12	0	0%	0%	0-5	0-5
	1600	66	1 CGS					
4/11/2011	0700	48	13	0	100%	90%	0-5	10-15
	1700	66	1 CGS					
4/12/2011	0700	50	14	0	5%	0%	10-15	0-5
	1500	60	1 CGS					
4/13/2011	0800	48	5	0	5%	15%	0-5	25-30
	1530	58	1 CGS					
4/14/2011	0700	45	6	0	0%	80%	0-5	10-15
	1500	66						

Second session

5/06/2011	0630	65	8	0	30%	10%	0-5	0-5
	1400	76	2 CGS					
5/07/2011	0630	62	17	0	0%	0%	5-10	0-5
	1400	75						
5/08/2011	0630	56	4	0	90%	0%	5-10	0-5
	1500	72						
5/09/2011	0630	54	21	0	10%	0%	5-10	10-20
	1500	75						
5/10/2011	0630	59	13	0	0%	0%	0-5	5-10
	1300	90+						

Third session

7/10/2011	0600	75	26	0	1%	0%	0-5	0-5
	0930	90+						
7/11/2011	0600	75	40	0	0%	0%	5-10	0-5
	0930	90+						
7/12/2011	0600	71	43	0	0%	0%	5-10	0-5
	1000	90+						
7/13/2011	0600	70	42	0	0%	0%	5-10	10-25
	1400	88						
7/14/2011	0600	70	46	0	0%	0%	5-10	10-15
	1430	90+						

*AGS=antelope ground squirrel, MGS=Mohave ground squirrel, CGS= California ground squirrel

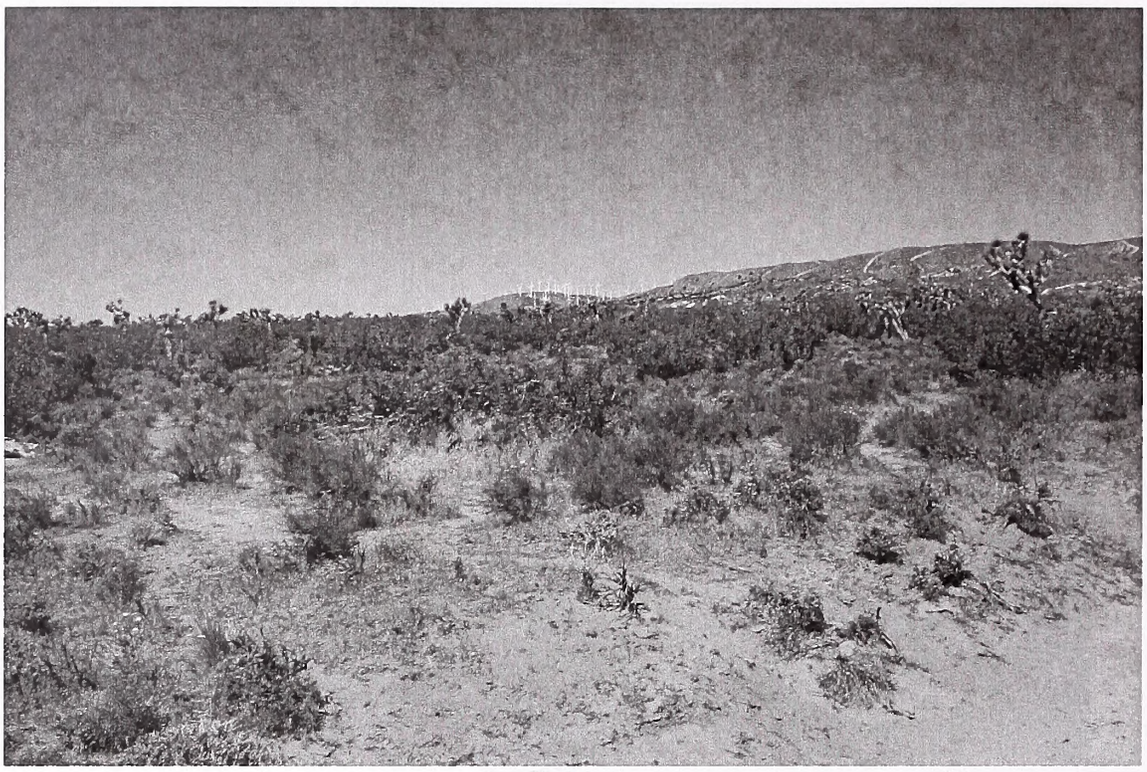
Appendix C – Photographs of Habitat at Each Trapping Grid



Grid 1



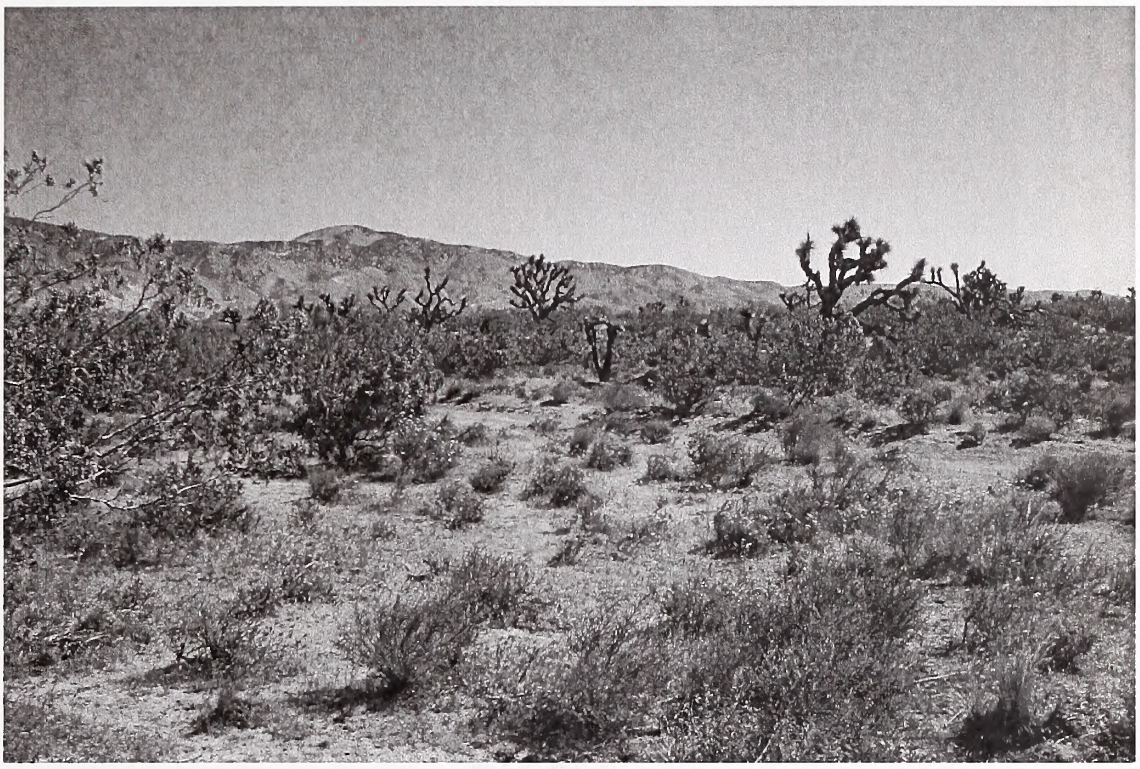
Grid 2



Grid 3



Grid 4



Grid 5



Grid 6



Grid 7



Grid 8



Grid 9



Grid 10



Grid 11



Grid 12



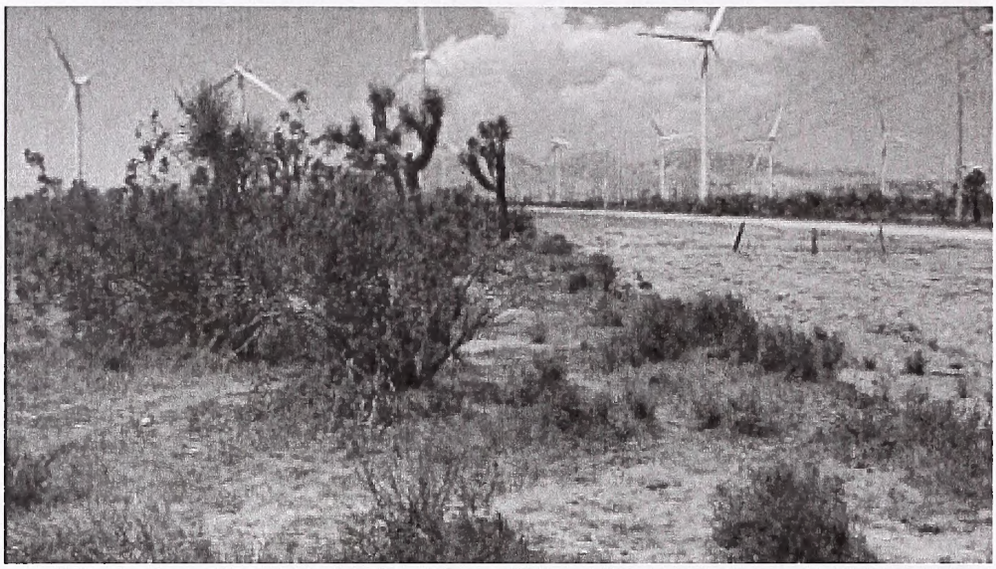
Grid 13



Grid 14



Grid 15



Grid 16



Grid 17



Grid 18



Grid 19



Grid 20



Grid 21



Grid 22



Grid 23



Grid 24